KPMG
cutting through complexity

Healthcare 3.0

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Prime numbers

Helping organizations unlock the value of big data p6

Technology will revolutionize healthcare. In fact, it is already doing so. The question the industry needs to answer is how much of this change is driven by healthcare organizations themselves and how much is down to governments, patients, vendors or tech giants such as Apple, Google and Microsoft.

The relationship that has been central to the healthcare industry throughout the history of medicine – that between doctor and patient – is being transformed by the internet. Online apps and mobile medical devices have increased patient engagement and created more personalized care options. Across the globe, research2guidance estimates that 500 million smartphone owners are already using healthcare apps. By 2018, 50 percent of the forecast 3.4 billion smartphone and tablet users will have downloaded an app. In the US, patients are already using social media to select hospitals.

The health system of the future will be one where prevention is better than cure, where people are less likely to get sick because they actively monitor their own health, where more of those who do fall ill are treated remotely and fewer of those who have still to be treated in hospital are readmitted because technology helps them – and their caregivers – look after themselves.

This is no utopian vision. As Roberta Carter, Partner, KPMG in the UK, shows on p14, this is already becoming a reality in various healthcare organizations today – in Canada, Italy and the US. Yet, to deliver this vision – and move to a more sustainable model of healthcare which delivers better outcomes while reducing cost – the sector needs to think long and hard about the technology it deploys. If healthcare organizations see IT transformation as an issue purely for the CIO, they will fail. As Richard Bakalar, Partner, KPMG in the US, emphasizes in his article on p6, organizations will only truly profit from big data if they look beyond the silos and share information that is accurate, timely and useful with whoever needs it – whether they be managers trying to forecast demand for services or clinicians needing actionable insight in the emergency room.

Similar 'soft' issues surround the industry's ability to make effective use of gamification. On p18, Jan de Boer, Partner, KPMG in the Netherlands, predicts that gaming could transform internal processes, patient behavior and clinical outcomes within five years – if organizations are realistic, flexible and committed.

Information technology, big data, gamification and analytics are not a cure-all for every challenge that faces the healthcare sector. Yet, as we detail on p12, we, at KPMG, have invested significantly in these areas because we believe the healthcare sector cannot transform itself – as it needs to do – without making innovative, strategic use of IT.

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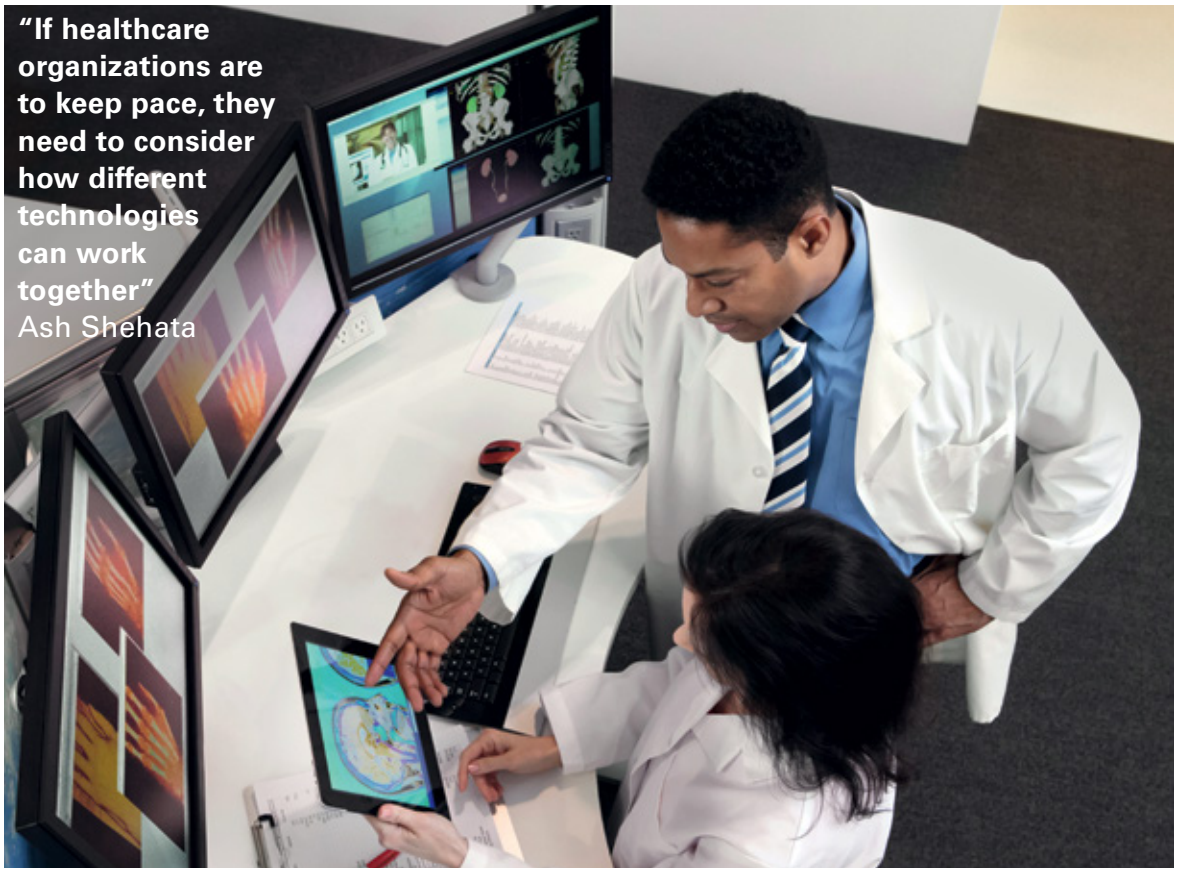

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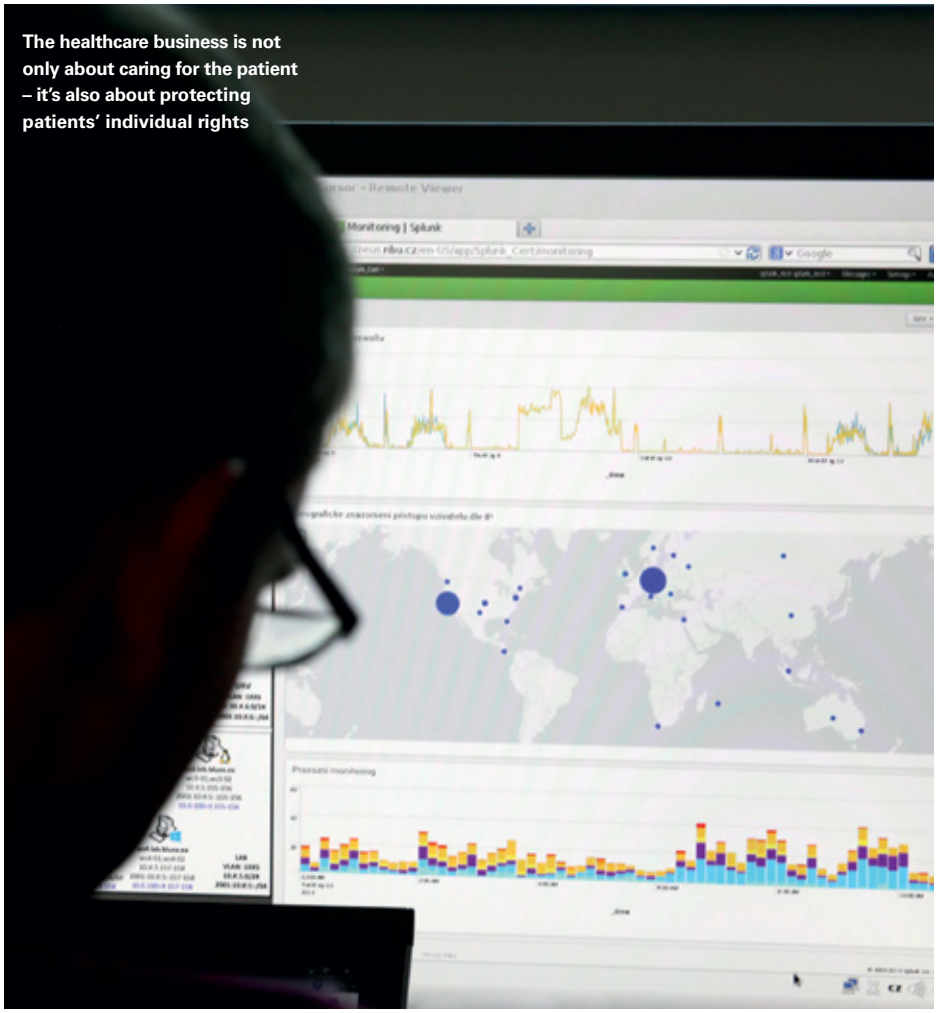
As strong as the weakest link. Creating value-based healthcare organizations
In a world of empowered patients, value is not one of the goals but *the* goal for all public and private providers.

Staying power – success stories in global healthcare
Key insights from KPMG's global healthcare conference of 65 healthcare leaders from 30 countries engaged in peer-to-peer discussions on strategies.

Creating new value with patients, carers and communities
Many industries have changed their value proposition in the past two decades. Healthcare is only just understanding how this might transform its own industry.

Top of Mind



The healthcare business is not only about caring for the patient – it's also about protecting patients' individual rights

How safe is your data?

With healthcare facing more cyber attacks and fraudulent claims, organizations need to put protecting patients' personal data at the heart of their business

Electronic health records, cloud storage solutions, mobile health apps, medical devices running on operating systems: nobody can accuse the healthcare industry of ignoring digital technology. Yet, when it comes to adequately protecting and securing these systems, it has a long way to go.

Only a few months ago, one major US health insurer reported that hackers had broken into its database and stolen records that contained personal information for approximately 80 million customers and employees. Last year, Community Health Systems fell victim to the computer bug Heartbleed and data from 5.4 million patients was taken.

Since October 2009, healthcare providers and organizations have reported more than 1,140 large breaches to the US Office for Civil Rights, affecting more than 41 million people. One survey by the Ponemon Institute reported that the percentage of healthcare organizations reporting a criminal cyber attack had risen to 40 percent in 2013, up from 20 percent in 2009.

Medical data is a popular target for criminals. Reuters estimates that medical information is worth 10 times more than credit card information on the black market as impostors try to get treatment they would otherwise pay for. **Michael Ebert**, Partner, KPMG in the US, says payers and healthcare plan providers are facing more fraudulent claims.

Although regulations such as HIPAA (Health Insurance Portability and Accountability Act), HITECH (Health Information Technology for Economic and Clinical Health), and the UK's NHS (National Health Service) Directive exist to improve patient privacy, much more needs to be done to resolve this issue.

Ebert says many healthcare organizations' systems are unknowingly compromised. "Antivirus software is just not enough. Attacks evolve constantly and are becoming increasingly sophisticated.

"A security breach is a symptom of an illness and diagnosing the actual illness is the real problem. Security needs to be at the forefront, not the backend. Organizations should take a proactive role in detecting risks and threats – no news is not generally good news."

The risk does not end with data breaches. Even medical devices can be hacked: "Almost everything is connected to the internet nowadays and is more susceptible to viruses and interception," says Ebert. "This means pacemakers, for example, can be tampered with, causing dire consequences.

40%

of healthcare organizations reported a cyber attack in 2013, up from 20% in 2009

"To block out dangers, we advise clients to lock down their systems and assess the environment. You need professionals in your organization – such as a chief security officer – who understand how the network works, as well as a combination of systems and architectures that you can assess and manage."

Ebert believes the real issue is that budgets are too small: "Are you going to put money into a brand new MRI machine or into a new firewall? Information security in healthcare is highly underfunded and, as a result, it is an easy sector to attack. Banks are much more fortified, and retail stores are making the necessary investments. Healthcare needs to catch up.

"It may add expense, but it's cheaper than trying to remediate a large breach, investigate and deal with lawsuits. Security is not an add-on, it should be at the heart of what you do every day."

When buying new technology, it's necessary to consider how security will affect every aspect of patient treatment. Ebert says organizations should consider what type of data the technology needs, how that data will move through the network, who will have access and who will be responsible for it.

The next hurdle is persuading patients to rely on internet-enabled technology, or trust hospitals to use it, to manage and share their personal data. This may be especially difficult if a patient has a condition that is particularly confidential and sensitive. Integrating security into systems and strategies from the very beginning is vital.

"The healthcare business is not only about caring for the patient," Ebert says. "It's also about protecting patients' individual rights, including their personal data. This needs to be as important as the treatment patients receive."

A new set of values

As care becomes much more patient-centered, and budgets tighten, the focus now is on 'value-based healthcare'

The age of 'doctor knows best' is fading as patients and caregivers are taking a more active role in their treatment. As a result, 'value-based healthcare' is in the spotlight, moving away from a model that rewards numbers of procedures or patients processed to one that improves care, has better patient outcomes and reduces costs.

Definitions of value vary. In its simplest form it can be described as the outcomes of care divided by the cost of care, which can be measured in terms of the efficient use of resources such as operating theaters, successful interventions and waiting times. At the highest level, true value is reflected in measures such as a patient's perceived ability to return to work, overall wellness and quality of life, which are influenced by their journey through the health system.

To help ease the transformation to becoming a value-based organization, KPMG's report *What Works: As Strong as the Weakest Link. Creating Value-Based Healthcare Organizations* provides a 'value maturity matrix' that recommends changes in the following areas:

- **Patient engagement** Patients and their representatives must play an active role in the design of care pathways.
- **Defining and measuring outcomes** Health systems can only deliver excellent value by systematically measuring outcomes, but professionals cannot be content with simply completing patient treatment; there must be an improvement in the longer-term outcome.
- **Coordinated care** Understand where the organization should be positioned and find trusted partners to deliver coordinated care.
- **Governance** One of the mantras of an effective value-based organization is: 'Centralize authority in a leadership that sets a clear vision and a strategy that will enable transformation. Decentralize decision making by empowering professionals across organizations to improve the way care is delivered.'
- **Contracting** Mobilizing contractors – whether an insurer, government agency or clinical commissioning group – to drive change.

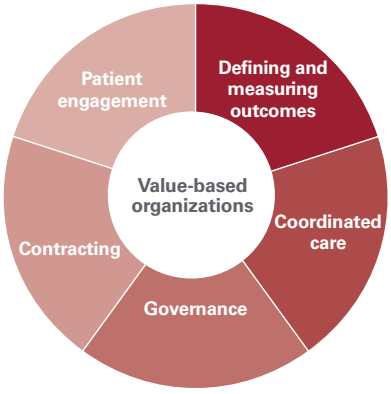
Providers and payers can use the matrix to assess their positions, evaluate any strengths and weaknesses and monitor progress toward value maturity.

Dr Anna van Poucke, Partner, KPMG in the Netherlands, and lead author of the report, says: "All elements of KPMG's value maturity matrix must progress concurrently. Failure to do so could hold back moving to a value-based organization. Care providers that are not transparent about outcomes of care to their patients and contractors undermine their future existence. The outcomes you measure should follow directly from what patients need and be agreed on with patients, their caregivers and professionals."

The report investigates how outcomes are heavily affected by the appropriateness of care. Dr van Poucke adds: "When patients are at the core of the healthcare system, a clear understanding emerges of where your organization is, or should be, positioned in the wider pathway."

Five key characteristics of value-based organizations

Source: *As Strong As the Weakest Link*, KPMG International, 2015



Trend Watching

Integrate to innovate

Apps, wearables and other IT tools need to be integrated into business solutions, says **Ash Shehata**, Partner, KPMG in the US, Global Healthcare Center of Excellence

From checking blood pressure to monitoring glucose levels, medical devices have advanced into online apps and mobile devices encouraging patients to manage their own health on the go, and allowing doctors to remotely monitor conditions and offer preventative care.

The app that has inevitably generated huge media interest is Apple's HealthKit. It gathers patient-generated health information from sources such as glucose measurement tools, food and exercise-tracking apps and Wi-Fi connected scales. Hospitals across the US are piloting the service.

IDC Health Insights predicts that, by 2018, 70 percent of healthcare organizations worldwide will have invested in technology including apps, wearables, remote monitoring and virtual care. By then, the number of telehealth organizations – the delivery of health-related services and information via telecommunications technologies – is expected to grow by 18.5 percent.

If healthcare organizations are to keep pace, they need to consider the strategic ways different technologies can work together to deliver an integrated, functional business solution that will offer a significant return on investments. This is where the role of the integrator is vital.

"If healthcare organizations are to keep pace, they need to consider ways technologies can work together"

Essentially, integrators search the marketplace to investigate what technology is available and how it could benefit the business while delivering a consistent workflow and creating a seamless experience for patients and providers. Integrators can give organizations confidence that a sizeable investment will pay off.

While the constant stream of new gadgets and apps brought to market can often distract organizations from the project at hand, integrators will help keep projects on target, on time and on budget while always looking out for the next round of innovation.

Organizations can partner with an integrator to build a business case for innovative technology, modernize current IT systems and ensure they get the necessary support, advice and practical solutions.

Organizations that are new to technology may want to start with a pilot program. The aim is not to determine whether technology works – many of these innovations have already proven their worth – but to explore how the technology could change business models, costs and patient care. These are the pilots that bring real value.

The healthcare industry has long passed the 'early adopter' excitement when it comes to the digital revolution. The question is, who can scale with value? Those who learn to do that will be best placed to succeed. And those who get there first will set the benchmark for the healthcare industry.

If healthcare providers unlock the latent value of the data they own, they can deliver better patient outcomes at a lower cost

Making data count

Healthcare providers are sitting on a vast resource of data which could transform the quality of care they provide – if only they could distill the insights they need in a given time, setting and context, says **Richard Bakalar**, **MD**, Managing Director, KPMG in the US, and member of the Global Healthcare Center of Excellence

Healthcare organizations generate massive amounts of valuable data on a daily basis. By one estimate the volume of healthcare data amounted to 150 exabytes in 2013 – and it is growing at a remarkable rate of 1.2 - 2-4 exabytes a year. The question that troubles most healthcare organizations is: are they really getting value out of it?

In developed economies, healthcare providers are driven by common goals: to become more efficient, reduce costs, improve patient experience and healthcare outcomes and innovate in the way they provide care. Investments in digital information can help organizations to realize these aims – if they learn to align the way they use and analyze big data to their core strategic objectives.

In the US, some 80 percent of providers use electronic records to manage information, according to the latest Healthcare Information and Management Systems Society (HIMSS) survey. Yet only 10-15 percent have achieved the highest level of digital maturity (using KPMG's scale – see p11).

In a crowdsourcing activity conducted by KPMG in the spring of 2014, over a third (36 percent) of healthcare leaders said technology and data together made up the single biggest area for improvement in their organization. There is clearly much to be done.

Despite massive investments in information systems, healthcare organizations have yet to derive full value from them. The main reasons for this include:

- Many doctors say they are overloaded with static, backward-looking reports that obscure critical insights, but they cannot access timely data for their current clinical work. Healthcare managers have similar complaints.
- The growth of burdensome regulation, coupled with external demands for more information, are making the situation worse.
- Payers, regulators and providers struggle to compare how primary care physicians, specialists, hospital departments and healthcare institutions are performing relative to their peers in the absence of common quality benchmarks. ▶

• Electronic transactional healthcare and financial payment systems are up and running, but healthcare organizations have not yet acted to aggregate and analyze that data in context with business and clinical intelligence tools.

The cost, effort and complexity of building a system to enable such transformative change might seem overwhelming. But, as the demands for change in the healthcare sector from patients, governments and regulators are not going to diminish, so the cost – and risk – of not making progress with information technology and data-driven intelligence is far more substantial.

Tough targets for information use

The sense of urgency around data use has increased recently, particularly in the US. A Federal mandate for healthcare providers to make 'meaningful use' of information is now being enforced – with penalties for non-compliance. Compliance means not only digitizing content, but also sharing it and using it for the demonstrable benefit of patients. Healthcare providers have to drive new value from their data – or surrender a percentage of their budgets they can ill afford.

Other developed markets have their own targets for record digitization and improving patient outcomes. In the UK, the Department of Health has recently established a dedicated National Information Board (NIB) to drive advancements in this area. Soon the NIB will publish a set of roadmaps, setting out in greater detail how digital care will be transformed in England and Wales.

The good news is that, having invested so heavily in converting records to electronic format, healthcare providers are sitting on a gold mine of data resources.

The challenge now is for data to be unlocked from transactional system silos, where it was used primarily for efficient record-keeping (for example for financial, clinical or operational scheduling use). Combined together, it can be used in innovative ways to support executive-level decisions or deliver timely insights to clinicians – and even patients themselves – thereby helping to deliver better care.

Patient, help heal thyself

A mental health initiative in Canada illustrates the possible rewards. The Mental Health Engagement Network (MHEN) project – conceived by Lawson Health Research Institute in collaboration with Canadian telecoms and Internet provider TELUS – has given 400 participants greater control over their mental health, allowing them to track their moods and medication and communicate directly with care providers between scheduled sessions.

The facilitating technology (provided by specialist health IT company Get Real Health in partnership with Microsoft) helps patients monitor and manage their conditions using customized online and mobile tools. Because patients are empowered with all this information as their health changes over time, their sessions with their care providers are more productive, leading to more informed, collaborative decisions about treatment options. As monitoring continues between sessions, care providers will receive an alert if a patient documents the same mood in their health tracker three or more times in a row, allowing them to intervene when necessary.

In the 1970s, hospitals stored data in giant computers. Today, data is much more accessible

> **"Many big data initiatives are at the 'advanced pilot' stage, being tested by clinicians excited by a vision of how things could be"**

Advancing clinical research

Taking data-sharing a step further, once everyday transactional healthcare data can be turned into timely intelligence and insight, it can be shared throughout the healthcare sector and with the life sciences industry so that it can inform clinical research, and the creation and accelerated delivery of new drugs and treatments. This is the ultimate vision that health authorities are working towards.

Getting to this point, and even the intervening steps of maturity (see box on p11), is much more than a technological challenge. It requires alignment from stakeholders from right across the organization (and beyond) if all parties are to embrace projects positively.

This common vision and commitment needs to be more than skin deep. If it is lacking, there is a significant risk of new systems being rejected however good they are – as has happened so often with health IT in the past.

Assuming that everyone wants the same thing, sees the value in working towards these goals, and can set up appropriate governance that includes every stakeholder, there are some specific steps healthcare organizations need to take to deliver tangible, measurable value from their operational data.

Creating order from chaos

As long as the requisite data has already been digitized, and is stored in a non-proprietary format, consolidating it so that it can be better visualized, analyzed and shared as context-specific insights should not require a significant incremental investment.

For a relatively modest supplementary cost, healthcare organizations should be able to unlock substantial latent value from existing data by creating a consistent platform for information management capable of crossing functional and organizational boundaries.

First, it must be possible to aggregate data from different sources without corruption, duplication or gaps in the information. So if specialist clinicians want to segment and analyze data about diabetic patients, they can be sure they are getting the complete picture based not only on confirmed cases that have already been coded, but also suspected cases indicated by other medical notes or lab data.

All of this requires that data is stored – or accessible – in a standard format that can be understood by other systems. Here, lessons can be learned from the experience of moving medical images such as X-rays from one set of systems to another. This task used to be onerous: migrating digital files could take as long as a year. But healthcare providers have learned that, if they store the content in a

GO FIGURE: DATA GENERATED BY HEALTHCARE

Why healthcare providers complain about information overload

1 MILLION

Images are added to the UK National Health Service database every day

21%

of US adults say they use technology to track their health data

15%

of US hospitals were using the cloud to store images in 2013. This is expected to exceed 50% by the end of 2016

26%

of US hospitals participate in social media

500,000,000

People around the world will use a healthcare app this year

43,000

medical apps are now available on iTunes

Sources: Demi & Cooper, Pew Research Center, Time, UK government, US Food and Drug Administration, Wall Street Journal, research2guidance

vendor-neutral archive (VNA), it doesn't matter if they later change front-end systems or need to use the content elsewhere, because the stored format lends itself to flexible re-use.

As it is all but impossible to predict how future systems and requirements will develop, using standards-based archives to hold critical data is a robust approach that will help ensure that valuable data assets can be repurposed and reused ad infinitum.

Various studies have suggested that the multipurpose use and re-use of data could be worth hundreds of billions of dollars to the healthcare industry. Yet the real opportunity may be bigger still: efficient, innovative use of data could help the industry develop new, more sustainable models of healthcare that put the patient first and enable better outcomes, however limited the resources.

Understanding the practical challenges

That transformation will only be realized in the long run if managers are realistic about the challenges that lie ahead in the short term.

Turning data into something of value is a much tougher task for healthcare organizations, than it has been for companies in the retail and financial services sectors.

Healthcare organizations start at a disadvantage, having a fraction of the budget for IT relative to their income. While retailers and financial institutions might have 20 percent of ▶

D&A IN THE DNA

Instilling a data-driven culture can deliver these key benefits

From volume to value

Linking multiple data sources can enable organizations to make the shift from volume-based healthcare to value-based and, where appropriate, allow them to take on greater responsibility for a population's health.

Analyzing the cost of care

Data can provide insights into how to create better, more cost-effective delivery models and ensure that clinical decisions about care are linked to financial and clinical outcomes. For example, identifying opportunities to care for patients in lower-cost settings, changing treatments or informing other decisions will improve value for patients and those paying the care bills.

Promoting consistent care

Unwarranted variation of care can be eliminated by implementing decision support, peer benchmarking and comparative data dashboards at the point of care and at management level.

Supporting clinicians in real time

Giving automated medical surveillance tools to clinicians in real time can prevent errors, enable a fast reaction to worsening conditions and spot trends in infection rates and other sources of concern about patient safety in hospitals and communities.

Drawing on business intelligence

Using data to create business intelligence systems paves the way to much more sophisticated resource management, helping to predict demand and improve patient satisfaction. Moving all data into a single, unified database to enable these capabilities is no longer necessary.

Empowering patients

Patients are engaged in their care through remote self-monitoring, personalized care planning, health education, diagnosis, and treatment tracking and alert/reminder tools that are linked to social networks.

In healthcare, the numbers of patients may be fairly manageable but the range and complexity of the data is vast

their annual revenue to allocate to IT-enabled innovation, healthcare organizations are lucky if they can spare 1-2 percent. So it is no surprise that the sector is 10-15 years behind the curve in its digitization and exploitation of data assets.

While retailers and financial service providers deal with huge volumes of transactions, each of these files has only a limited number of fields and ways that the data needs to be looked at. In healthcare, the numbers of patients may be relatively manageable, but the range and complexity of the data recorded is vast.

There is similar disparity in the numbers of systems used to collect, store and display this data. In financial services, there might be three or four core systems on an IT network. In healthcare, the number is likely to be closer to 200. All of this adds up to a lot of variables for a data warehouse to cope with – and for healthcare providers to translate into something meaningful that will help them identify and track high-value variations or gaps in care and deliver better quality outcomes.

That's why so many big data initiatives in healthcare are still at the 'advanced pilot' stage, being tested out on limited populations by forward-thinking clinicians excited by a vision of how things could be in the future.

This 'start small' approach reflects a recognition that there is a lot of work still to be done in determining where the real value might be in an organization's data, what quality looks like, and how all of this might inform new delivery models.

It is also a prudent way to test and develop the business case for investment. As peers begin to see what success looks like, this will fuel enthusiasm and commitment to initiatives more broadly across the organization. It makes sense to include internal marketing and communications teams throughout any projects so they can promote the vision, control expectations, and pass on good news at key milestones. Momentum doesn't just have to be maintained, it has to be seen to be maintained.

Staying focused

Approaching initiatives selectively and incrementally helps keep projects focused on specific use cases and groups of users. One of the objectives of 'meaningful use' ventures is to allow individual frontline users to find the information they need to support a query. This means they will not only be able to call up the data they want at the point of need (rather than having to wait a month for a specialist information analyst to produce a report, by which time the need may have passed), it also means being able to distill and interpret insights at a glance. This demands data query, extraction and presentation capabilities that allow findings to be visualized differently – using customized, user-friendly dashboards – geared to each user and the specific task at hand.

> **"Retailers and banks may spend 20% of their revenue on IT innovation. Healthcare organizations are lucky if they can spare 1-2%"**

At KPMG's Healthcare practice, we refer to this as 'thought flow' (as distinct from 'data flow' or 'workflow') – presenting information in the right way at the right time to the right person to support the right decisions.

University Hospitals Birmingham NHS Foundation Trust in the UK provides a good example of tailored data to match individual thought flow. It uses customized self-service reporting to support its Clinical Quality Strategy, by monitoring clinical indicators and outcomes, and staff performance.

Its senior leadership team uses simple dashboards populated with real-time data to inform activities such as physician prescribing behaviors, which in turn affects mortality rates. This allows the Trust to demonstrate its relative safety record – something that is becoming increasingly important as the NHS begins to give patients more choice in which hospitals they go to, and provide more information to the public to make these choices.

Logistical issues

Another challenge is how to address concerns about privacy and security as healthcare organizations strive to share patient data for analysis. Although the risks are no more onerous than in a financial or retail context, healthcare data and its treatment is more emotionally charged. There are many ways of tackling this, from stripping out personal identifiers for more population-based studies of data, to providing multiple levels of controls about who can access data and in what context. The important thing is to define the criteria early on so that the right measures are built into policies, IT strategies and systems.

Often, the hardest part with any new IT-enabled change initiative is getting started. KPMG's network of professionals can help organizations identify where they are today on the continuum of maturity for digital information management, and the provider's own reasons for moving to the next level. Together the teams can then map out the next steps to delivering something tangible that will deliver real payback, a step change in care quality, and inspire other parts of the organization – and external parties – to take-up complementary initiatives.

Another important area where the KPMG team can help is in calculating who all the beneficiaries of the new improvements will be, so that healthcare organizations can begin to form appropriate partnerships – thereby potentially sharing the load and the financial burden for any new investment.

Extracting tangible value from big data isn't a smooth or predictable business. Investments are incremental, where organizations build on success, learn from defeats and think hard about the information they need that will deliver most for the organization.

Yet, in healthcare, the potential rewards are obvious and transformational. Most providers are on the same journey – the goal is to deliver better care more efficiently. Big data can help them achieve that.

ASSESS YOUR CLINICAL INTELLIGENCE PROGRAM

Richard Bakalar, MD

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Source: KPMG International

To develop a comprehensive approach to useful data, organizations need to progress across seven different areas. Priorities and pace will be determined by each provider's needs and goals, but it may be helpful to think of these as seven steps towards data maturity:

1 Getting governance of information right
2 Making digital data the norm
3 Bringing data together
4 Using the data to add value to the organization
5 Using it to support clinicians
6 Using systems and data to empower patients
7 Extending the data's value and reach to clinical research

KPMG's maturity index uses a scale ranging from 0 to 5 to gauge an organization's maturity, based on specific characteristics in each area. In this index, 0 represents the least advanced state, relatively speaking (eg. where data is unstructured and unusable); 5 represents the ideal state (eg. where data is leveraged to the fullest extent to drive value); and the numbers in between represent various interim stages (eg. in terms of the degree of data aggregation and analytic capabilities).

At the more mature end of the spectrum, for example, patients could be given direct access to an automated, proactive IT service using their health data, which actively alerts them to take medicine, complete exercises, or record food intake – giving them more control over and responsibility for their health, and engaging them in their care. By helping organizations clarify their status in relation to each point in the maturity index, we can help define a clear roadmap for improvement that is aligned with the organization's strategic ambitions and goals.

TURNING BIG DATA INTO CRUCIAL INSIGHTS

Advanced data analytics will facilitate radical change in the healthcare sector. **Ash Shehata**, **Bharat Rao** and **Sean Groer**, three of KPMG's healthcare analytics leaders, explore the opportunities ahead

The transformation now demanded of the global healthcare industry may seem vast, complex and daunting, but advanced data analytics can help organizations successfully manage that change.

"The healthcare sector is on the verge of huge transformation, which will be driven by the increasing availability of data," says **Ash Shehata**, Partner, KPMG in the US and member of the Global Healthcare Center of Excellence.

Lighting the way

KPMG has invested in a substantial Data and Analytics center of excellence, a resource that underpins every aspect of the firm's global consulting, services and solutions business. Known as Lighthouse, this world-class data analytics capability combines the expertise of 1,500 data scientists, software engineers, data visualization specialists, actuaries and implementation specialists. It has been built through a process of organic growth, strategic hiring and the targeted acquisition of specialist companies – including Link Analytics, Cynergy Systems and Zanett.

Powerful relationships also have a vital role to play – both with influential IT brands (such as IBM, Microsoft and Oracle), and with owners of vast amounts of health data. KPMG in the US's partnership with US firm Health Intelligence Company, whose data resources include information from national Center for Medicare and Medicaid Services (CMS) claim records, has opened up access to the world's largest integrated medical and prescription database.

Access to such rich sources of information will help healthcare organizations to look beyond their own four walls and make deductions about populations and sub-groups – drawing on information built up from over 120 million individual unique interactions with GPs, hospitals, community and long-term care, insurance companies and pharmacies.

From quantity to quality

So, what does this all add up to? Advanced analytics describes a set of tools or capabilities that turn big data into timely decisions – by distilling and serving up specific, targeted insights to particular people in a given context. This can now be done using complex combinations of data that have been created in a variety of formats from many sources.

As healthcare targets become more patient-centric and closely aligned with total value and long-term outcomes, organizations' ability to make the most of their data will be mission critical.

Electronic medical records, and back-office systems that look after the surrounding

administration and financial detail, provide a good starting point. These systems were expensive to establish, so attention is now turning to how the industry can better exploit these data assets to meet strict new requirements on care quality and value, while still fulfilling the usual budget targets.

By joining forces with other parties, and gaining access to broader data resources through KPMG in the US, the healthcare industry can generate sophisticated insights and inspire new innovations in care delivery. "One of the biggest opportunities in advanced data analytics is in combining partnerships between healthcare providers, life sciences companies, funders and insurers to create new data combinations we haven't seen before," says Shehata.

Encouraging business-like behavior

Data integration, data analytics and data visualization technologies are now so advanced that it is possible, practical and affordable to ask very complex questions, and get quick, accurate answers that inform specific situations. Over time, these scenarios will evolve from conjecture based on limited historical data to reliable predictions that facilitate better use of resources.

Two decades ago, a decent analytics capability would have required a dedicated, expensive supercomputer the size of an entire room. Now, the average person has access to more processing power in their smartphone, and advanced analytics solutions are increasingly available online via specialist cloud services.

Immediacy of insight is improving too. In traditional analytics models, it could take months to answer a single question. Now, with a fit-for-purpose data analytics and visualization platform, it's possible to answer thousands of questions in a fraction of that time. Even if only a small percentage of these yield something significant, such a high throughput could result in actionable opportunities worth millions of dollars.

Learning from other industries

The healthcare sector is not all that different from more commercial markets such as retail and financial services. In those industries, organizations have developed analytics capabilities to help them understand their customers, and deliver greater value while controlling costs. The same techniques must now be applied in healthcare.

Using advanced analytics facilities, insurers can conduct more detailed risk analyses and governments can make more accurate forecasts – both about health-related spending and about likely crisis points unless preventative measures are taken. Consumers, GPs and commissioners can begin making more informed choices about clinicians, institutions and drugs or medical devices – favoring those proven to deliver the best outcomes and the best value for money.

"Consumers are demanding to know what's going on. They want greater transparency about what their doctor is doing, and the ability to choose the hospital, as well as the best treatment for their condition," says **Bharat Rao**, Partner at KPMG in the US and National Leader for Healthcare Data Analytics.

The best treatment is not always the cheapest, episode by episode, but – as advanced data analytics can show – it may be the most cost-effective over time. "A project we're working on with two leading cancer centers in the US can help them demonstrate that their higher-quality, higher-cost care leads to better outcomes and a lower total cost of care due to reduced complications," Rao says.

Deeper analysis could stimulate innovation in medical bundles too – for example, by highlighting which radiology procedures might be optimally included in care packages. They could support tough decisions about which patient groups gain priority access to costly new treatments and shed insight into the relative efficacy of generic versus branded products which, if shared through social media, could change consumers' behavior.

Making it happen

Exploiting advanced data analytics requires a powerful platform that enables all kinds of data to be pulled together quickly and mined accurately for insights which, presented in an intuitive, user-centric way, can support a decision. "The real value of big data is in the small data that can be extracted and analyzed on demand. If I want to figure out who the best radiologists are in a 100-mile radius of a particular zip code, that's a very specific decision that requires a lot of big data," says Shehata.

Secure, cloud-based analytics services can help with 'data democratization' – bringing some of the tools to everyday users, so that data and insights empower more people. In future, we can expect to see more unstructured data (the more chaotic kind that search engines like Google process so effortlessly) analyzed alongside traditional sources.

Whether healthcare organizations top-up their data digitization investments by adding their own advanced analytics capability, pool resources with other parties, or buy in services to perform analyses externally, timely insights can improve the quality of decision making.

The time is now

The healthcare sector's growing interest in analytics is fuelled by pressure to measure success differently, manage funding shrewdly and satisfy patients who want more say in their care. Technology is key to meeting these needs.

"Healthcare is changing faster than any other industry now," says **Sean Groer**, Managing Director for Customer Strategy & Growth Analytics at KPMG in the US. "Data and analytics can help healthcare organizations cope with the change and keep up with requirements."

KPMG's data analytics resources can help in all of these scenarios, combining the latest tools and techniques with our vast global capacity and deep heritage in healthcare transformation and health IT, and respected methodologies that draw on cross-industry best practices to help ensure that new initiatives deliver results quickly. "Advanced analytics may be new to healthcare, but it is vitally important," Groer says. "The key to success will be a business case that provides for quick wins along the way."

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"The real value of big data is in the small data that can be extracted and analyzed on demand"

Could technology be the cure?

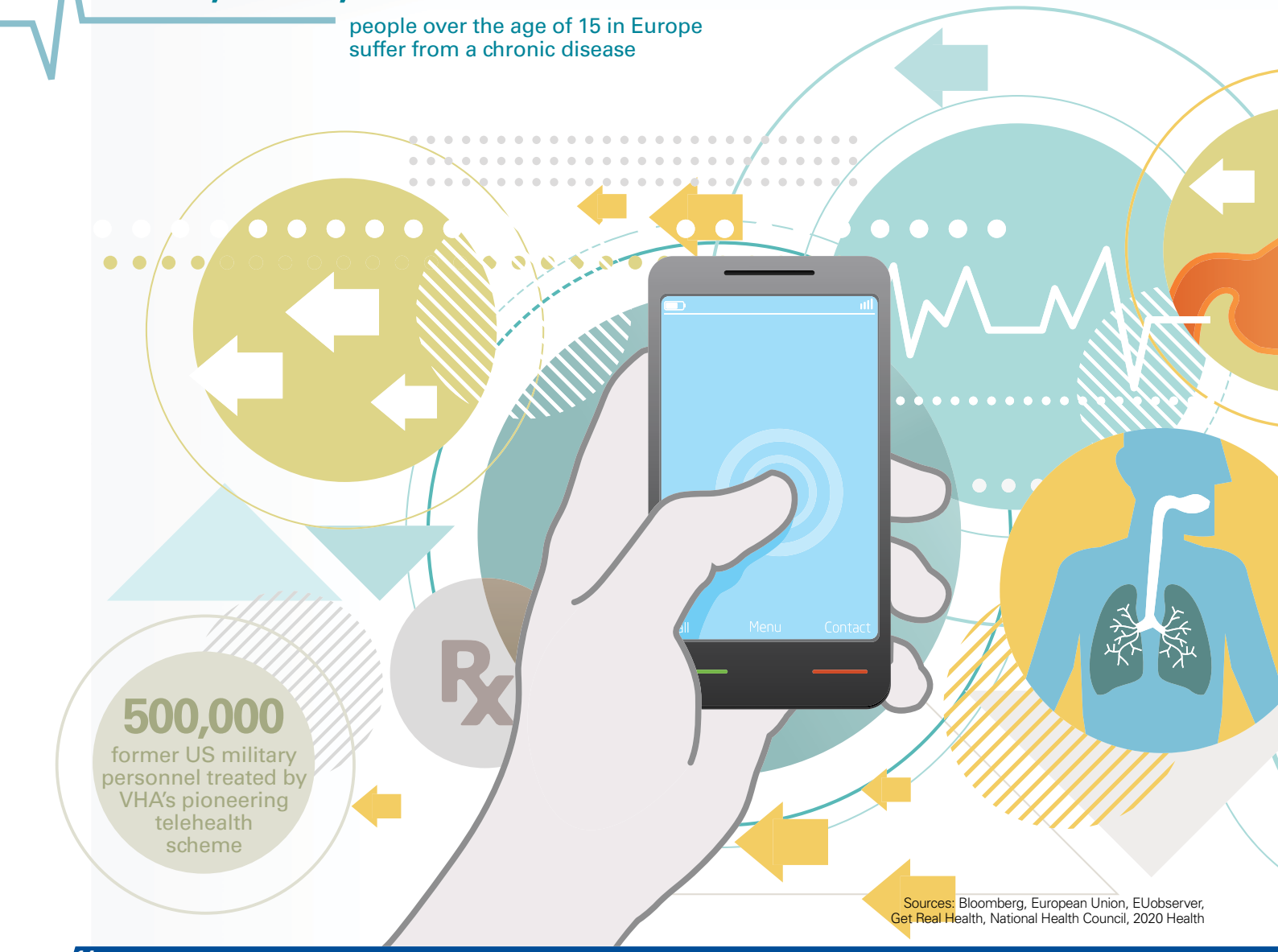
Next-generation technology will make a big difference to the treatment of chronic conditions, enabling services to be better targeted – and empowering patients, says **Roberta Carter**, Partner, KPMG in the UK, and Health IT Commentator

Necessity can be the mother of innovation. As healthcare organizations across the world strive to cope with the relentless, significant increase in patients suffering chronic and long-term conditions, quality of insight – rather than the size of the budget – will be key.

In the US and Europe, chronic diseases and conditions – those lasting for more than three months – account for between 70-80 percent of

60%
reduction in readmissions among Canadian mental health patients

100,000,000
people over the age of 15 in Europe suffer from a chronic disease



500,000
former US military personnel treated by VHA's pioneering telehealth scheme

Sources: Bloomberg, European Union, EUobserver, Get Real Health, National Health Council, 2020 Health

healthcare costs. By 2020, the National Health Council estimates that more than 157 million American adults will be suffering from at least one chronic condition. Advanced technology – including telehealth applications and 'big-data' analytics to prioritize care – could help organizations treat and manage these complex conditions. Patients and caregivers can stay connected and treatment can be provided in the community. New tools will help patients and their care teams understand more about the patient's health and take action to prevent conditions worsening, reduce time spent in hospital and improve quality of life.

Technology could lay the foundation for a new model of healthcare provision that moves away from reactively treating illness to proactively promoting wellbeing – a strategy that is better for patients, and cost of care.

Prevention is better than cure

Examples of what can be achieved are emerging all the time. MedStar Health, a not-for-profit regional healthcare system serving Maryland and Washington DC in the US, is one of the organizations testing remote patient monitoring to treat people suffering from chronic conditions.

Targeting diabetics who have trouble maintaining blood sugar levels, MedStar gave individuals a glucose meter linked to a smartphone app, connected to a cloud-based interactive personal health record platform. A simple color code showed patients if they were within acceptable limits. Patients were also given tasks in a personal self-management action plan (weight, medication compliance and exercise) and rewarded if these were completed daily.

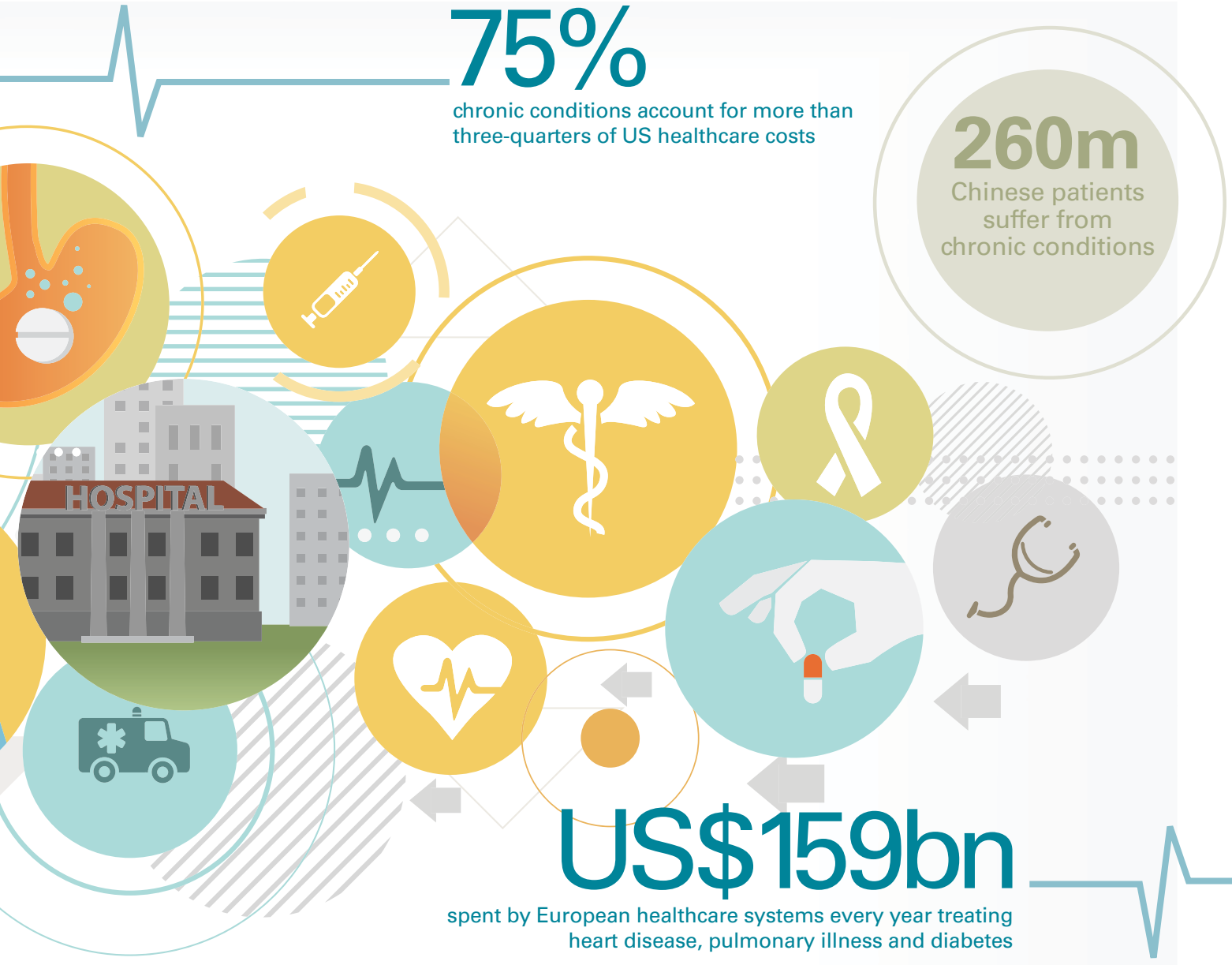
This simple, cheap, feedback-and-reward system significantly improved patient readings: 88 percent of those on the trial still use the tool.

Such initiatives show what can be done if healthcare providers can overcome the obstacles and adopt new technologies.

Developing markets – less encumbered by legacy systems – are leapfrogging more mature countries, as they seek to maximize the reach of limited healthcare services. In Peru, a rural medical network in the Napo River Basin now connects 18 rural health centers to referral hubs, giving geographically dispersed patients access to remote real-time evaluation by specialists via video or audio. In Nepal, the Lumbini Eye Institute's telemedicine network links its main center in Bhairahawa with a dozen satellite clinics, improving access to eye health services and allowing for faster triage of ocular pathology.

In more developed markets, the healthcare sector's established care pathways – and a degree of disillusionment about technology – have inhibited progress.

The process of procuring and implementing new systems is often lengthy and complex. Investments can take an age to approve and don't always deliver as hoped. This might be because targets have changed in the meantime, systems haven't been thoroughly integrated, or because staff have resisted new working methods. ▶



The risk of obsolescence is not insignificant – by the time one system has been implemented, technology may have moved on.

As development cycles keep accelerating, the only way healthcare organizations can really remain ahead of the curve is for healthcare providers to strike agreements with IT partners that give them the flexibility to draw on the latest technology. Adherence to agreed technology standards can help providers connect and share information between systems, either internally or with other care providers.

Overcoming patient isolation

The Veterans Health Administration (VHA), which looks after American military personnel returning from combat, shows what can be achieved if organizations take a joined-up approach to technology. To provide consistent, high quality care to each individual, wherever they are, the VHA uses telehealth solutions to monitor and interact with patients and their caregivers as they go about their daily lives so they don't have to travel to special healthcare facilities as often – especially critical because 40 percent of veterans live in rural areas that are hard to access.

A comprehensive electronic health record (EHR) provides a single view of each patient, built up from acute, primary and secondary care and information from caregivers and families. This is being supplemented all the time, via direct mobile connections to patients and carers.

> "The toughest challenge is getting influencers and decision-makers to think afresh about healthcare provision"

A simple text-messaging facility is used to recommend lifestyle changes to patients, remind them to take medication, and carry out exercise or treatment regimes. Remote support for caregivers reduces isolation and stress, keeping them connected and providing information in a convenient fashion.

After a home-based telehealth pilot, the VHA reported a 30 percent drop in hospital admissions. Estimated to be the biggest single telehealth program in the world, the scheme's reach has been growing by 22 percent a year, making more impact as connectivity becomes more mobile.

More targeted and personalized care

The creation of personalized, community-based treatment plans for patients necessitates more connected systems and a freer flow of information. Healthcare providers should build holistic profiles of patients from data collected at different points (at home, in the community, in hospital, at the doctor's or in clinics). It is imperative that this data is reliable, consistent, up to date, and open to comparison.

Healthcare providers should build holistic profiles of patients from data collected at different points

Specialist 'big data' analytics solutions can be extremely useful here. Subtle patterns can be extracted from patient information – so we can learn more about how conditions progress overall and then use that for individuals.

On a broader scale, big-data analytics can inform forecasts about the likely demand on services in a region – for example, based on identified health trends combined with local demographic data. Information about heart rate, blood pressure and blood oxygen levels is more valuable when combined with public health apps that monitor and/or advise on levels of activity, calorie consumption and dietary information.

Easily accessible mobile tools combined with cheap cloud-based data storage and processing can help forecast health outcomes and requirements, enable patients to manage their conditions and encourage healthy behavior by the public.

The latest self-help innovations inspiring curiosity include Google's prototype contact lens glucometer, Samsung's Simband (which captures personalized health data, including sleep patterns) and Apple's HealthKit app.

If such launches persuade individuals to share valuable information about themselves with healthcare providers for deeper analysis, they could genuinely enhance patients' lives.

Vinod Khosla, co-founder of Sun Microsystems, has even suggested that, with such devices enabling machine-based diagnostics and treatment plans, 80 percent of doctors will not be needed in the future. Such predictions sound extreme but algorithm-based diagnosis and health prediction are already a reality.

Breaking down intra-organizational barriers

If healthcare organizations are to provide true patient-centric care, they need to 'see' the individual so they can make the right deductions about their long-term needs.

Building reliable Electronic Health Records from different sources is impossible unless healthcare organizations look beyond their own boundaries. At the moment, targets and policies of reimbursement only give 'soft' guidance on intra-organizational collaboration – presenting this as a useful consideration, rather than an essential criterion.

Other practical hurdles include how to identify individual patients conclusively (for example, if many local people have the same name and birth date). There are legitimate concerns about patient security, especially if joined-up care means their data is shared beyond organizational boundaries or fed into centralized systems for analysis (see page 4).

Technology can surmount all these hurdles. As Tim Kelsey, Director for Information for NHS England, noted: "If you can do mobile banking securely, there is no reason not to have mobile health." The solutions are rapidly becoming more accessible and affordable.

Creative investment

The toughest challenge is getting influencers and decision-makers to think afresh about healthcare provision. Being able to see the expected payback of any new systems helps considerably – especially for organizations that have been 'burned' by failed projects.

By investing in telehealth – and issuing every patient with a smart card that contains all their health information – the Italian region of Lombardy has helped healthcare providers acquire a more accurate understanding of average cost per patient and develop individual care plans for specific chronic conditions. Using big-data analytics, Lombardy has segmented 70,000 patients according to risk levels, enabling it to issue telehealth equipment to high-risk individuals, and give phone support to those designated as medium risk.

The initiative would have floundered without the buy-in of every contributing party. With

strong commitment from local politicians, the region grouped doctors into collective businesses and reimbursed them on a per-capita rate for each care plan, with incentives/penalties for good or bad outcomes. As an added incentive, doctors' cooperatives retain 10 percent of any savings delivered.

Targeting risky patients has helped Lombardy improve outcomes and reduce costs. Hospitalization rates have fallen significantly and physicians can now spend more time in the community.

Affordable technology

In hospitals and clinics, mobile devices are making face-to-face time more productive, giving clinicians a more complete picture of a case history at the point of need, so they can deliver better care. In the community, mobile systems have proven they can reduce repeat admissions. In Canada, a trial of Get Real Health's mobile personalized patient engagement and care management system cut readmission rates among mental health patients by 60 percent.

As the cost of technology keeps falling, and more telehealth applications become available on a simple subscription basis, innovative solutions are easier to implement. As long as they are approved for secure use in the local healthcare sector, the barriers to adoption are low – and getting lower. The equipment needed to run them is minimal, especially if the systems are remotely hosted. Organizations no longer need dedicated servers to analyze big data – even the most complex calculations can now be performed instantaneously and securely in the cloud.

Self-service devices for patients are becoming cheaper and more 'professional'. Readily available home-based blood pressure monitors and blood sugar readers produce results a doctor can trust.

Translating vision into action

These examples illustrate what's possible if healthcare organizations harness next-generation technology to deliver a bigger vision. The rising demand for services, and growing budgetary constraints, is forcing healthcare providers and overseeing bodies to think laterally.

Five years ago, the largest randomized controlled telehealth trial was completed in the UK. Funded by the Department of Health, the Whole System Demonstrator Trial involved 6,000 patients (3,000 on telehealth and 3,000 on telecare) across three regions of England. In one trial, by using joined-up information and remote monitoring to prioritize urgent cases, community matrons were able to see nearly double the patients a week – compared to before the trial.

After decades of promise, the strategic use of technology in diagnosis, monitoring, and the provision of remote support to patients so they can better manage their chronic conditions is finally on the verge of being adopted in mainstream medicine.

The details of how best to achieve this goal are still being crystallized, but some important prerequisites are now clear:

- Holistic, integrated and mobile electronic health records can shift the burden of care from institutional settings to the home and in the community.
- Patients – and the public – must be encouraged to take more responsibility for their own wellbeing and managing their health/conditions.
- To facilitate this self-management, the most pressing need is to create a single view of the patient, drawing data from across the healthcare ecosystem (to produce a similar service to that experienced in banking). Reimbursement models need to reward performance based on quality and appropriateness of care and by incentivizing patients to help care for themselves.
- If physicians, caregivers and patients are to create new models of care, technology companies (hardware and software vendors, integrators and service providers) need to fully embrace mobility.

Success requires strong leadership. The use of modern technology to improve care for people with chronic conditions is inevitable, whether individual providers embrace it or not. Organizations need to decide which is the larger risk – bold action now, or no action at all.

KEY CONSIDERATIONS

Roberta Carter

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The key factors to consider when harnessing technology to help manage chronic health conditions

Identify a compelling reason to change

It's not just the budget. While technology can be driven by finance, efficiency and practicality, it is the moral imperative that makes it work for the VHA. They needed to look after veterans returning from military service from across the world. They couldn't be asked to attend clinics and travel great distances, particularly if they are unwell, so it became a moral imperative. The lesson for healthcare providers is that to keep your medical teams engaged in making the level of change that needs to be made, they need to understand why they are doing it and that it's not just about efficiency. There is a moral imperative that speaks to the heart of why people go into healthcare.

Define a digital strategy

Don't focus exclusively on IT infrastructure. Consider every aspect of your engagement with patients, clinicians, families, caregivers, staff and the community.

Keep projects manageable ...

... but also scalable. The EHR is the bedrock of an effective patient population management strategy. Beyond primary and secondary data sets, healthcare organizations need to incorporate information from caregivers, family members, patients and, in due course, from social media (for example, using feedback from patients to help decide investment in new services).

Choose an open architecture

New, cheaper, better and more inherently mobile technology will keep emerging, so IT supplier agreements and the back-end architecture should be flexible enough for front-end capabilities to be updated.

Invest in analytics

Collecting vast amounts of data is only valuable if something significant can be deduced and done with it, so the purpose needs to be clear at the outset.

Engage patients

A two-way process of engagement helps both parties. Mobile technology is ideal for connecting with patients and carers in a natural, intuitive way.

Engage clinical staff

Coercive 'encouragement' – such as fiscal penalties for avoidable readmissions – can drive regime change but reward mechanisms are more effective. Sharing the benefits of improving services and better outcomes creates goodwill and encourages acceptance of change. Reimbursement should be linked, at least partially, to patient feedback – from individuals and groups via social media analytics.

Remove usability barriers

Many great IT systems have failed because they required extensive training, weren't very intuitive to use or had a clunky user interface. Clinicians and patients much prefer systems that make their lives easier and more productive.

Track consistently

If you're not measuring something, you can't improve it. By tracking the impact of change, healthcare organizations can plan to get more things right.

Power of PLAY

By the age of 21, a typical young American has spent around 10,000 hours playing computer and video games. As writer Malcolm Gladwell has famously suggested, people who practice a skill for 10,000 hours by that age are likely to become expert at it, so it is easy to understand why airlines, armies and healthcare providers are using gaming to engage with people (staff, customers, the general public) in new, more efficient and effective ways.

Gamification is no fad. Within five years, it will play as crucial a role in transforming internal processes, patient behavior and clinical outcomes as social media has in revitalizing customer interaction. The applied gaming market (use of gaming for something other than pure entertainment) is estimated to be worth US$15 billion globally, and is expected to be more lucrative than the traditional game market (currently worth US$70 billion) within five years.

In healthcare, gaming could transform everything: how surgeons develop and practice their skills; how patients participate in their care; and how entire countries advance medically. Gaming is already facilitating new kinds of collaboration and innovation in healthcare. How organizations approach this opportunity will vary depending on their agenda and the readiness of their operations to realize its potential.

Students hone emergency skills on abcdeSIM

Gaming can transform medical training and engage the public in medical advances. **Jan de Boer**, Partner, KPMG in the Netherlands, explains how it can be used profitably and strategically

Experimenting for the future

Although the opportunities are immense, it would be fair to say that healthcare's participation in the gamification revolution is still at an experimental stage. Yet, as more providers begin to prove the possibilities, organizations will build gaming into their transformation strategies – whether these are built around patient care, cost-efficiency, or sustainable long-term service provision.

In one of the most powerful examples of what can be achieved when gaming is applied on a wide scale, Cancer Research UK asked the public to help identify anomalies in archives of breast cancer images (Play to Cure). The stroke of genius is that by playing the game you are helping scientists analyze gigabytes of genetic information from thousands of tumours. Participants relished playing a problem-solving game while making a contribution to society – in a way that might benefit them or their families in future.

The public analyzed large volumes of data in minutes that would have taken salaried researchers hours to process. By turning the game-playing public into 'citizen scientists', Cancer Research massively over-achieved on a modest budget, and reached out to a new audience. This application of gaming also released the latent value in big data, turning historical records into rich resources for clinical research.

This is an external example of applied gaming that uses the medium to involve consumers in healthcare. Other, more contained, examples of external use involve individual hospital departments employing gaming for a particular purpose with patients.

In the Netherlands, games are being used with patients suffering from dyslexia, autism and anxiety disorders. Gaming provides new ways to connect with and engage individuals – by enabling them to 'experience' and work through different scenarios in a safe yet realistic environment. Treatments for autism include immersing the person in everyday situations – for example, when a cup of water is dropped – enabling those affected to develop effective coping mechanisms in a world where order and structure aren't always within our control.

Modelling success

How extensively healthcare providers benefit from process, task and treatment gamification depends on their vision, how they incorporate the medium into their organizations, and how they build it into their strategy and governance.

The most productive way to plan for this is to use a maturity model. KPMG has developed a model specifically for gamification (see diagram opposite). This can help organizations determine exactly where they are – and where they want to be in future – on a continuum where immaturity is the very start of the journey (experimentation), and maturity represents the most advanced use cases, supported by a holistic vision and robust roadmaps. The model allows for differences in purpose, approach and maturity at each stage. For example, an organization may use a very advanced, multiplayer game in one specific area, or a simple game that can be repurposed many times. Some games will have numerous benefits – better care, lower costs and greater patient engagement – while others could serve one purpose very well.

Ideally, a game would have a range of benefits and pave the way for extensive re-use right across the organization and beyond.

Established use cases

Two cases of applied gaming in the Netherlands illustrate varying degrees of maturity. The first is Erasmus University Medical Centre's 2012 application of an emergency medical simulation game, the second Radbound University's 2013 implementation of a game helping medical students to provide care to elderly patients.

At Erasmus, a specially developed emergency medical simulation program – abcdeSIM – gives students and healthcare professionals the chance to practice emergency medical skills without taking a risk with patients' health.

Based on a detailed physiological model containing more than 200 parameters relating to circulation, respiration and consciousness, the game offers a realistic, immersive experience, where trainees can see the result of treatment.

Rather than restrict the benefits to one application, the Erasmus Medical Centre has founded a spin-off company to manage the development and use of its applied games – within the hospital and by third parties. In this way, it can multiply the benefits of the original development, while ensuring that the game is developed and enhanced – for example, through the introduction of more patient scenarios.

At the last review, the abcdeSIM game was being used by more than 1,000 healthcare professionals in the Netherlands. It is also being introduced in medical institutions in two other countries and developed so it can be applied to other disciplines outside acute healthcare.

The abcdeSIM game is advanced in its format too, as it supports both single-user and multi-player features. Although the simulated treatments are single-player challenges, game competitions have been held at four academic conferences between doctors and nurses, creating very high levels of engagement.

Adapting to the complexity of elderly care

At Radbound University, the applied game – Geriatrix – has a narrower focus, helping medical students practice providing care for elderly patients. The goal is to teach complex medical reasoning with students behaving as consulting doctors in various simulated situations. When students have decided on a treatment, points are awarded for decisions that suit patients, reduce costs; and are medically useful.

Students tackle three cases in one particular course (around 200-300 students use it each year), but do not then use Geriatrix in other aspects of medical school. Yet the game could be broadened to cover other aspects of the medical curriculum. The potential return on investment is high because the basics can be easily copied and adapted. The University's goal is to develop a licensing system so that other organizations can use the game.

Think big, start small

These examples give a flavor of the kind of initiatives that could work well for healthcare providers as they start to explore gaming.

Even if it feels too early to develop wider ambitions – due to budgetary pressure or the need to establish partnerships and engage stakeholders – it is worth keeping the big picture in mind from the start. It's vital that preliminary initiatives don't end up restricting future development. With KPMG's game maturity model, you can highlight every option available to you and explore the wider implications of each decision.

Geriatrix is helping Dutch students care for the elderly

GET INTO THE GAME

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What you should do...
Ensure the game maturity model aligns with your broader organizational strategy. Use it as a platform for implementing a game strategy that fits your operational plans.

Make sure all the necessary stakeholders are committed to the use of the game maturity model. Ideally, top management must endorse the model and the idea of applying gaming in a healthcare context. Where possible, link plans and goals to specific aims of healthcare workers and doctors.

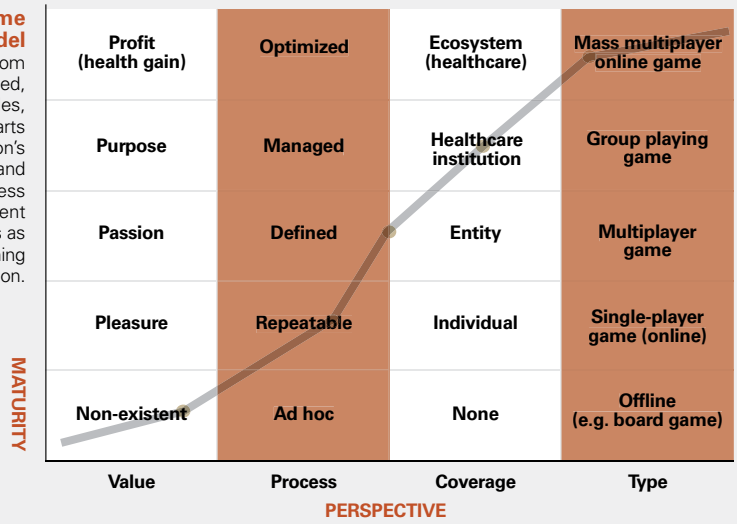
Adapt the game maturity model to your organization's maturity when embracing innovative processes and tools.

Assess the costs of introducing or developing applied games against the expected added value.

Try to combine – and extend – game initiatives in use within the organization.

Five mistakes to avoid…
1. Don't aim for perfection from the start. Not every aspect of gamification can be measured quantitatively.
2. Don't strive to achieve maturity in too many ways at once. Start with key targets.
3. Don't get too immersed in technical detail. Use and apply games, while continually evaluating what works for your organization.
4. Don't underestimate the effort and cost involved in harnessing games. Applied gaming is largely new to healthcare. Where possible make use of existing games and knowledge.
5. Don't neglect the importance of a robust cost/benefit analysis before and after investing.

KPMG's game maturity model
Adapted from respected, maturity scales, this model charts an organization's starting point and planned progress across different dimensions as they apply gaming to their operation.



One crucial early consideration is the merit of creating a platform for a wealth of similar games, versus investing in standalone, single-use products. Engaging a specialist developer to create a one-off product will be a wiser investment if it leaves scope for adaptation.

Adopting or adapting something that already exists in the marketplace could make sense. A useful analogy can be drawn with the situation with financial systems more than 20 years ago. Organizations that had their own bespoke systems developed initially benefited from more control but some of them were later burdened with legacy systems that were expensive to maintain and upgrade, and were not easily integrated with other business applications.

That said, using a reputable applied game developer is essential if new development is required. Creating a genuinely engaging game that resonates strongly enough with players to deliver the required result needs a good deal of skill and knowledge.

Don't be afraid to experiment

Even healthcare organizations that have not formulated long-term plans can experiment with gaming. Building a proof of concept will strengthen the business case, and inspire potential stakeholders by giving them something tangible to review.

Ultimately, applied gaming is a tool for healthcare providers to consider as they approach new targets or strive to realize their ambitions for positive change. In this sense it is no different to other technologies: to be effective it needs to be part of an overarching strategy and seen in conjunction with other solutions rather than in isolation.

There is no substitute for engaging users in developing a new game. Getting their input early on will help ensure they use, enjoy and promote the game later – and the more engaged, rewarded and motivated people feel when they 'play', the more likely the investment is to pay off.

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