

Priorities—and Challenges— Facing Today's Healthcare CIOs



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EXECUTIVE INSIGHTS: [HEALTHCARE](#)

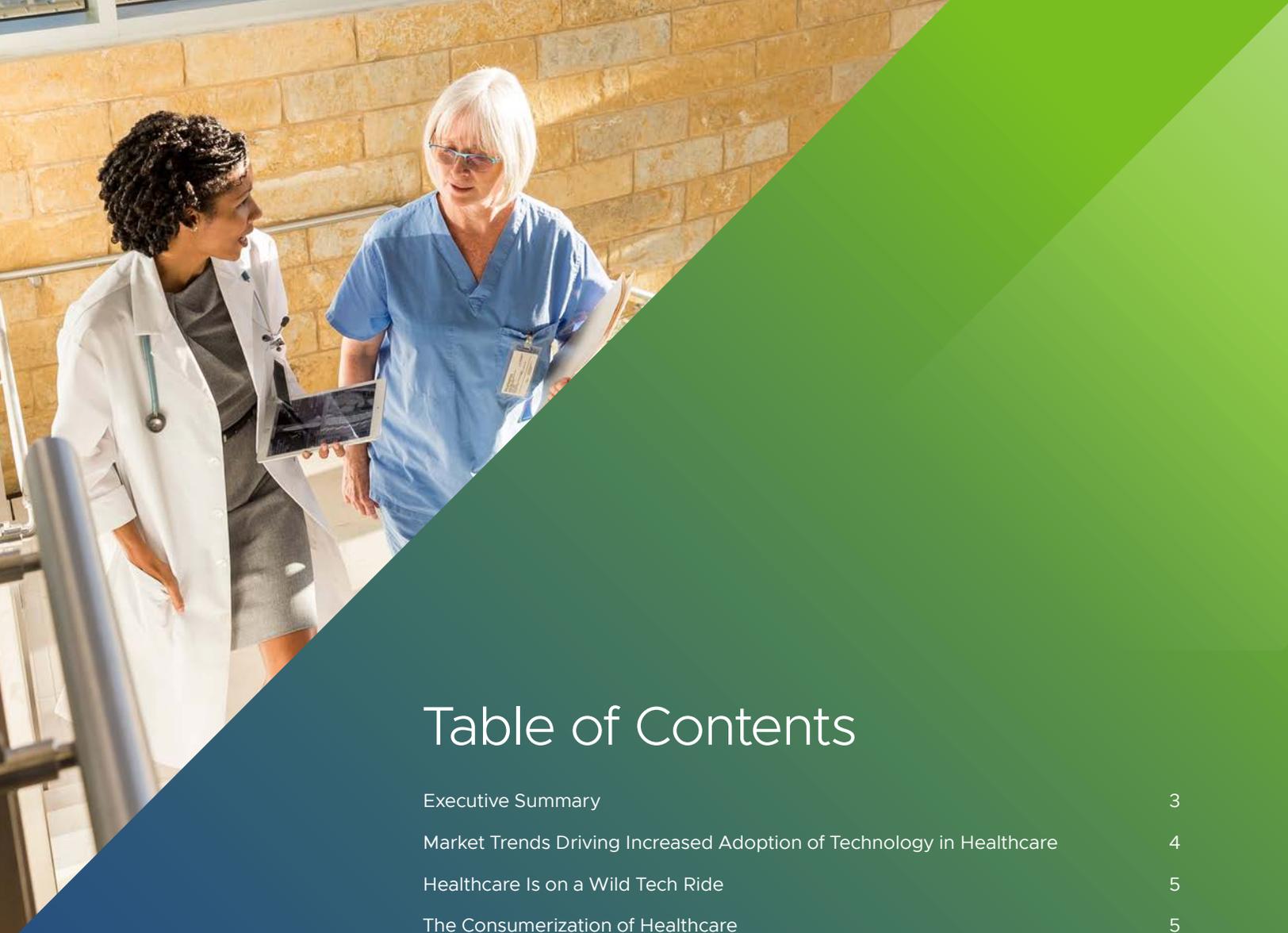


Table of Contents

Executive Summary	3
Market Trends Driving Increased Adoption of Technology in Healthcare	4
Healthcare Is on a Wild Tech Ride	5
The Consumerization of Healthcare	5
What Is Real-Time Connected Healthcare?	6
The New IT Mandate: Accelerating Growth While Containing Costs	7
Telemedicine	7
Mobility	9
Cloud	10
Cybersecurity	12
Managing a Turbulent M&A Environment with Real-Time Connected Healthcare	13
The value of real-time connected healthcare	13
Getting Started	14



Executive Summary

Healthcare executives are aggressively investing in technology, with most (79 percent) growing their *IT budgets by at least 20 percent annually*.

What technologies are leading healthcare providers deploying? Cloud. Internet of medical things (IoMT). Artificial intelligence/machine learning (AI/ML). Robotic process automation (RPA). Mobility.

Indeed, the industry is rapidly integrating technology into every aspect of the care continuum. Whether it's accelerating transformation to new, patient-centric care models, more accurate illness diagnoses, or more efficient hospital operations, technology promises to be a major disruptive force across healthcare for the foreseeable future.

This paper examines the top priorities and challenges of some of the largest health system CIOs, including

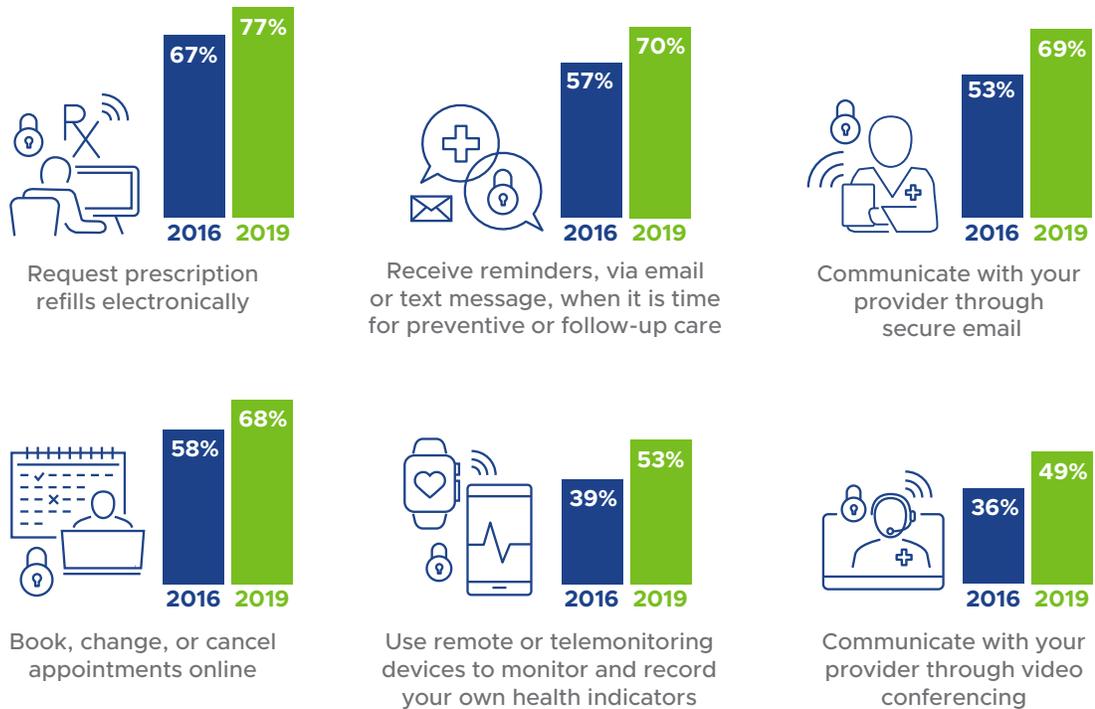
- Market trends driving increased adoption of technology in healthcare
- Technologies driving improvements—challenges and opportunities
- The new IT mandate: accelerating growth while containing costs
- Managing turbulent merger and acquisition (M&A) environments

Read on to learn about healthcare CIO priorities and how they can be used to achieve the benefits of real-time connected healthcare while overcoming the challenges of inserting emerging tech into a competitive—and volatile—marketplace.

Market Trends Driving Increased Adoption of Technology in Healthcare

Even as patients demand more personalized and convenient services (Figure 1), there are urgent calls for the healthcare industry to reduce costs while expanding revenue opportunities.

Most healthcare executives (62 percent) point to declining reimbursements as a top challenge to their organizations, according to *Porter Research*. To combat this loss of income and stay relevant in an industry navigating record levels of M&As, healthcare leaders are looking to grow revenues by offering new services and opening up new markets, such as telemedicine.



Source: *Accenture*

Figure 1: Patients are selecting healthcare providers based on digital services offerings.



TECHNOLOGY INVESTMENTS DRIVE A RANGE OF BENEFITS

- **Improved patient outcomes** – Seamless integration of medical devices with the cloud and electronic health records (EHRs) make real-time data accessible to healthcare practitioners, driving far better patient outcomes.
- **Enhanced patient experience** – By digitally streamlining ways to get medical treatment—such as digital scheduling, electronic prescriptions, communicating directly with doctors electronically, and receiving text reminders for maintenance or check-up appointments—patients get an overall better experience.
- **Increased operational efficiencies** – Medical devices with embedded RFID chips streamline hospital internal operations, such as medicine supply chain management.
- **Improved healthcare ecosystem** – *More than half (52 percent) of healthcare executives* pointed to data sharing between providers, payers, government, and industry as a critical aspect of serving patients better.

“The future belongs to visionary leaders and forward-thinking organizations that are able to break the shackles of legacy systems and accelerate mastering digital-first strategies.”

MUTAZ SHEGEWI, RESEARCH DIRECTOR,
IDC HEALTH INSIGHTS

Healthcare Is on a Wild Tech Ride

Boundaries between healthcare and other industries are blurring, according to 43 percent of healthcare executives *recently surveyed*. More than half (54 percent) report that traditional industry value chains are being replaced with new value models and 51 percent say competition is coming from new and unexpected places, such as Amazon and Google.

Industry leaders envision real-time connected healthcare solving many patient care and business challenges, but how can providers successfully integrate innovations into operations to reach such new and ambitious goals?

The Consumerization of Healthcare

Patient experience is at the heart of healthcare’s frenetic adoption of new technologies. In an acknowledgment that the industry has become as competitive as retail and manufacturing, healthcare is no longer courting patients, but *customers*. And the “consumerization” of healthcare, with its patient-first philosophy, is driving extraordinary change.

Consumerization is the idea that people can quickly and easily interact with any business—healthcare providers included—through smartphone apps. Why not? Customers shop that way, ordering products from Amazon and booking tables at restaurants. However, meeting the needs of consumers anytime, everywhere requires a complete mindset change for healthcare organizations—often including moving from prioritizing what’s good for the hospital or clinic to designing systems and processes that work first for patients.

For those willing to pioneer digital change to achieve real-time connected healthcare, overcoming challenges with people, process—and sometimes even the technology itself—is essential. But when done right, the results can be transformational.

What Is Real-Time Connected Healthcare?

Real-time connected healthcare is a vision. It is accomplished by building a foundational, agile digital infrastructure that spans any cloud, any app, and any device. With real-time connected healthcare, providers can create an operating model capable of giving clinicians, technicians, staff, and applications the secure, always-on access to patient information they need—from the right device to the right task—at precisely the right time.

For those on the journey to real-time connected healthcare, incremental improvements are continuous. Providers see improved cost, quality, and delivery of healthcare from the data center to the point of care.



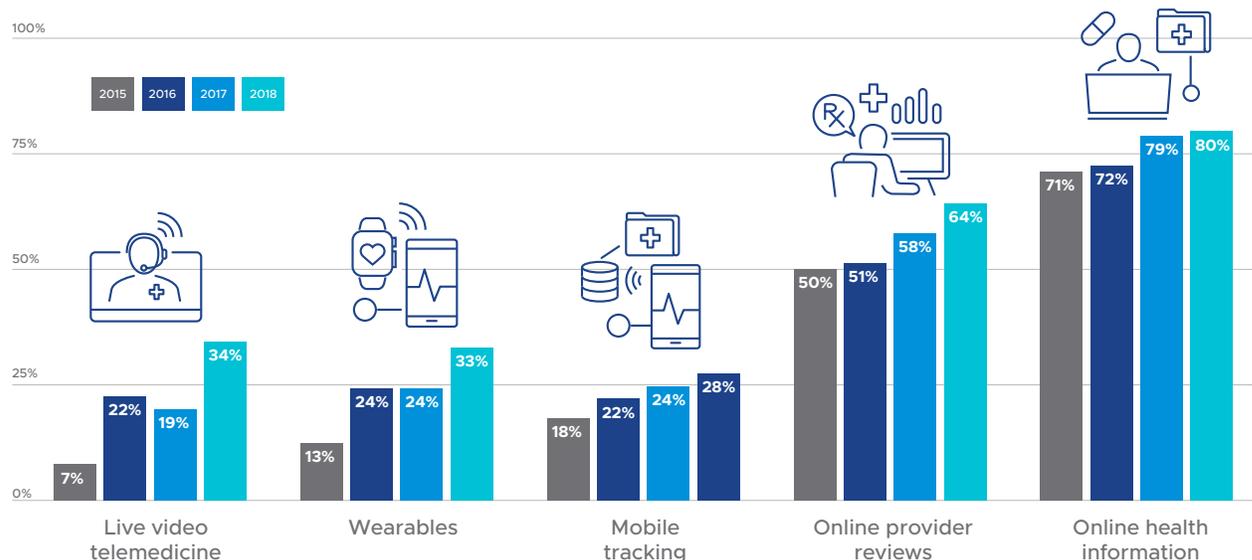
The New IT Mandate: Accelerating Growth While Containing Costs

Changing demographics—specifically, growing populations with ever-higher proportions of aging persons and subsequently higher rates of chronic and lifestyle diseases—are causing healthcare costs to spiral. These factors are putting pressure on healthcare systems around the world. In the United States, healthcare spending is predicted to rise to *almost 20 percent of the GDP by 2026*. (EU healthcare costs *are approximately half that*.) Then there are the medtech firms and tech giants like Amazon and Google that are encroaching on traditional health markets. How can healthcare providers hope to compete effectively?

Technical innovation offers both opportunities and challenges to healthcare providers. Here are some of the key areas the largest health system CIOs believe are important to prioritize: telemedicine, mobility, the cloud, and security.

Telemedicine

Telemedicine is growing in popularity as a cost-effective way for medical providers to diagnose, treat, or monitor patients remotely. The global *telemedicine market* will top \$56 billion by 2023, with an impressive CAGR of 16.8 percent. Popular IT tools used in telemedicine include videoconferencing, teleconferencing, email, big data, analytics, medical imaging, and devices from the IoMT, among others (Figure 2).



Source: [Rock Health](#)

Figure 2: Telemedicine is increasingly popular among consumers.

Easier-to-use applications and patients' growing acceptance of accessing medical help remotely through smartphones and computers will continue to drive the growth of the telemedicine market.

Challenges in telemedicine

According to a recent survey from the American College of Physicians, there are still some barriers to the widespread implementation of telemedicine. The most serious:

- **Regulatory and reimbursement uncertainty** – Questions about reimbursement (*63 percent of patients* don't know if telemedicine is covered by their insurance policies), licensing (many states and countries don't allow physicians to practice across borders), and regulatory (HIPAA and other laws mandate strict privacy for all online interactions) have slowed progress.
- **Internet connectivity quality issues** – Internet connections are not always good enough for an adequate videoconferencing session between patients and doctors, much less the advanced telesurgeries that are starting to be tested at leading healthcare facilities around the world.
- **Network and storage bandwidth** – The legacy enterprise networks of providers can't always handle all the traffic. So much data is generated by these sessions that providers have trouble storing it, much less analyzing it.
- **Security** – With so many different devices attaching to the network, how do providers keep cybercriminals away? (More on that to come.)



THE VALUE OF REAL-TIME CONNECTED HEALTHCARE

With virtual cloud networking and leading software-defined data center technologies, healthcare providers can move from operating in silos to a single, integrated, secure platform that allows them to embrace the opportunities of telemedicine.

Opportunities in telemedicine

The good news is that these challenges are easing. Many states have passed “parity” laws that compel private insurers to reimburse healthcare providers for telemedicine services. The Centers for Medicare and Medicaid Services (CMS) recently approved telemedicine as a funded benefit under Medicare Advantage. Internet connectivity is improving, as are models of compute, networking, and storage, especially as healthcare organizations explore the cloud.

The trend toward *intrinsic security* also is boosting the protection end to help telemedicine reach its full potential. These are among the top benefits telemedicine offers when barriers are surmounted:

- **Win and retain patient loyalty** – When considering doctors, *81 percent of consumers* are more likely to choose a healthcare provider that offers telemedicine services over those that do not.
- **Increase revenues** – The additional services that providers can offer patients broadens the revenue base. A case in point: *A full 87 percent of adults age 65 and older* want to stay in their current homes and communities as they age, and easing Medicare telemedicine regulations are paving the way for greater provider reimbursements.
- **Ease clinical staff shortages** – Telemedicine can reduce the increasing problem of doctor, nurse, and clinical personnel shortages by minimizing the need for in-person visits for non-urgent cases, accelerating patient triaging, and freeing up resources for serious illnesses and emergencies. *Business Insider Intelligence* found that telemedicine can take on between 42 percent and 45 percent of the 1.2 billion outpatient medical care events that occur annually.



“The virtual platform makes it much easier to go between patients. I find I spend less time out of the room and more time with my patients.”

AMY POUND, DIRECTOR OF MEDICAL STUDENT EDUCATION, UNIVERSITY HOSPITALS OF CLEVELAND



The Christie

THE VALUE OF REAL-TIME CONNECTED HEALTHCARE

For thousands of U.K. cancer patients, the care, treatment and support provided by staying at The Christie provide a critical lifeline. But delivering this quality of care safely, consistently and efficiently 24/7 across a highly complex, multi-site campus while complying with the U.K.'s National Health Service (NHS) “Paperless 2020” digital transformation mandate was challenging. By putting in a comprehensive virtualized server, desktop, and network infrastructure with additional operational management tools, The Christie was able to deliver the highest quality patient care by freeing up clinicians’ time to spend with patients.

Mobility

Mobile technology is already an important part of healthcare operations. Mobile devices and apps help clinicians work more efficiently and allow for more face-to-face time with patients. Wearables are making patients more attuned to their health and responsive to their caregivers. In fact, mobility is growing so fast that the global healthcare mobility solutions market is expected to see a *CAGR of 25.5 percent between 2018 and 2023*.

The challenges of mobile health

Yet having many different devices accessing the network creates headaches for healthcare providers:

- **Security** – How do providers manage security when unknown devices are accessing the network from anywhere and everywhere 24/7?
- **Application performance** – How do healthcare organizations ensure uptime and high performance for the mission-critical apps being used “on the edge” of the network by clinicians, perhaps in life-or-death scenarios?

The opportunities of mobile health

As these challenges continue to be met, mobility is poised to impact healthcare positively on even greater levels. Mobile devices and apps help clinicians and administrative staffs operate more efficiently and effectively. The booming wearables market generates huge volumes of data that can be used to analyze patient health for better outcomes. And mobile devices can cut the cost of caring for patients with chronic conditions. Here’s a deeper dive into these benefits:

- **A more convenient clinical “workstation”** – Caregivers are always on the go. Tablets and smartphones used by doctors, nurses, and administrative staff alike can support all aspects of patients’ experiences—from checking them into hospital beds to tracking vitals and medication doses to viewing scans and other images while at the patient’s bedside. This allows clinicians to have more personalized, face-to-face interactions with patients, all while cutting costs.
- **More patient data to analyze** – On the patient side, the rise of mobile and biometric wearable devices such as smartphones and smartwatches is giving healthcare providers access to the sort of data they previously only dreamed of having. Heart rates. Activity levels. All this rich data can be communicated to caregivers and analyzed for early illness diagnosis.
- **Improve care outcomes by connecting patients with the greater world** – Personalized tablets with special software can help connect patients with the world beyond the hospital walls during what can be emotional and challenging times.
- **Reduce costs through remote monitoring** – Vital signs, such as blood sugar levels, and critical data from mobile and other IoT devices can be used for remote monitoring and alerting, reducing unnecessary hospitalization costs.



THE VALUE OF REAL-TIME CONNECTED HEALTHCARE

Like all healthcare providers, *Low T Center* is highly regulated and must adhere to federal guidelines. One of those mandates is that to treat a patient, the provider must have uninterrupted access to that patient's records. If clinicians do not have access, then they cannot care for the patient. While these guidelines and compliance requirements have been in place for more than 20 years, networks have been evolving at breakneck speed. Just 5 years ago, patient records and billing systems were stored locally at the provider's medical facility. Today, Low T Center stores all patient records and billing systems in the cloud to allow doctors to evaluate and diagnose patients regardless of location. Its operation was transformed by a software-defined network that provides continuous visibility and visualization of network performance as well as support for a new voice platform with stellar quality of service. The provider is future-proofing the network for long-term projects.

Cloud

Industry leaders concur that cloud is a profound disruptor of business as usual, and that it is redefining how they run their organizations. Healthcare is no different. And there's a rich array of solutions from which to choose. Technology companies—large ones and startups alike—are spending millions of dollars building the infrastructure, services, tools, and applications to help healthcare providers take advantage of the cloud. The global healthcare cloud computing market, which was valued at approximately \$4.5 billion in 2016, is expected to *increase to nearly \$16 billion by 2025*.

Challenges with cloud

How can healthcare providers build realistic cloud strategies against the backdrop of hype? It's difficult to predict exactly how cloud will impact healthcare in particular because of the complexity and uniqueness of the industry. Still, cloud is rolling out in healthcare. *IDC found* healthcare providers are allocating 45 percent of their software and IT infrastructure spend to cloud sourcing models.

Here is a sampling of what healthcare providers need to consider when formulating their moves to cloud:

- **Security** – The chief challenge is how to adequately protect digital health records, as these have increasingly been targets of malicious attackers.
- **Compliance** – Providers need to comply with the growing number of mandates for privacy and security, such as HIPAA in the United States and GDPR in Europe.
- **Technical debt** – When moving to the cloud, how do healthcare organizations integrate or replace legacy technology on which their businesses still depend?
- **Skills gap** – Finding experienced cloud professionals is difficult and this challenge is expected to get worse as the global *cybersecurity workforce gap* reaches 1.8 million by 2022.
- **Governance** – Because one of the benefits of cloud is how easily organizations can access and use resources, providers need to be able to control usage so costs don't spiral out of control. Moreover, they need to formulate standards for providing digital services and create appropriate service-level agreements (SLAs).

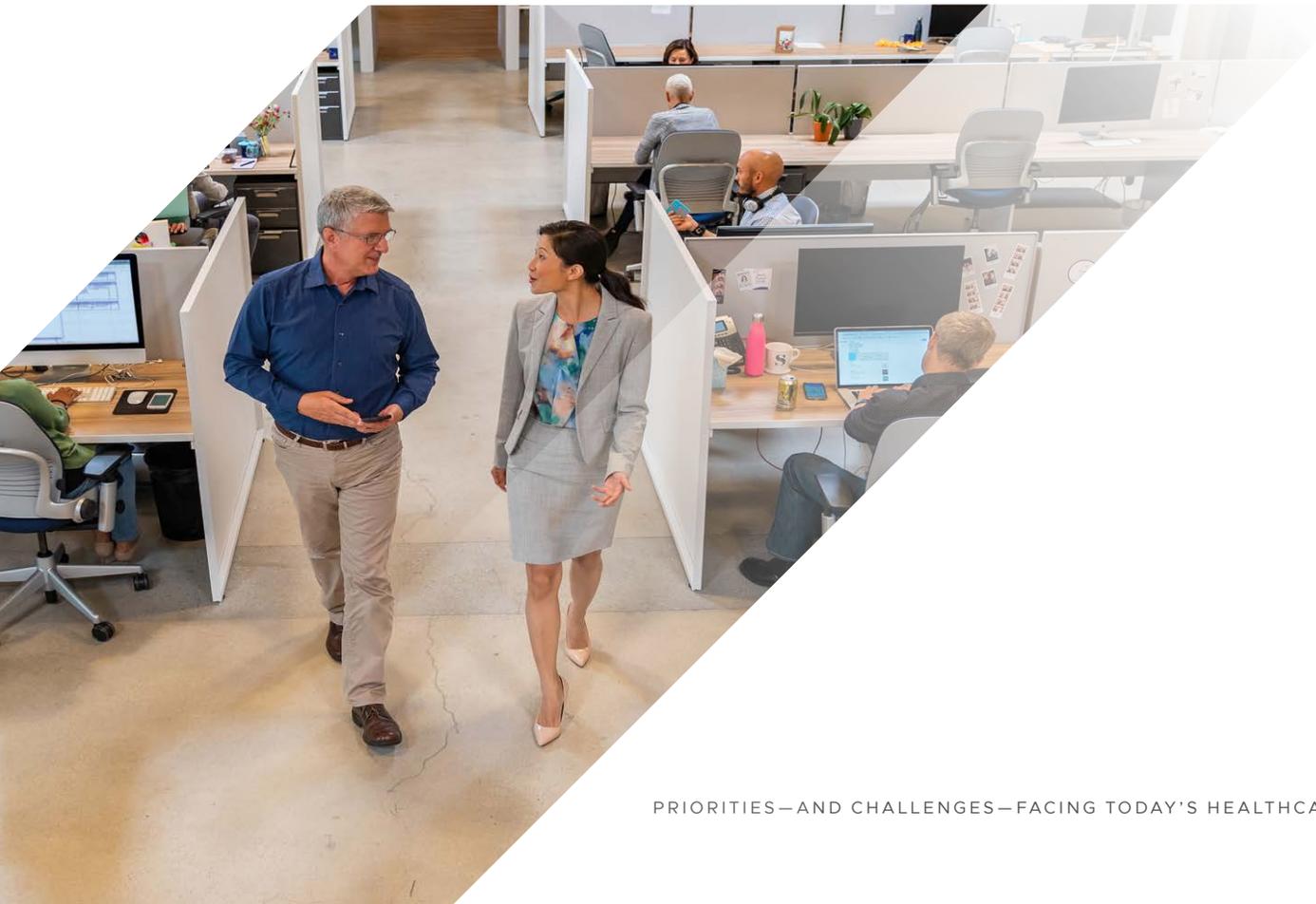
Opportunities with cloud

There are so many benefits to cloud, it's difficult to know which should top the list. The first one typically mentioned is cost savings: Because there's no cost associated with buying or maintaining physical servers, IT can reduce expenses—both capital and operating. But the bigger advantage of cloud is *agility*. Healthcare providers can scale operations quickly to meet new market opportunities or challenges. Cloud also makes it possible to use advanced technologies such as AI and ML, which require the massive storage and compute capabilities of cloud to operate.

Additionally, healthcare generates massive amounts of data—data that was previously untapped because of technical difficulties accessing it, analyzing it, and managing it. Cloud removes these barriers, allowing the healthcare community to keep up with an ever-changing competitive landscape.

Cloud benefits also include

- **Flexibility** – Providers can scale up and scale down their use of cloud resources based on needs, and pay only for what they use.
- **Disaster recovery strategies** – Replicating data, applications, and even entire data centers in the cloud is now possible, protecting healthcare businesses from disaster, whether natural or man-made.
- **Manage and measure resource consumption** – Providers can keep close tabs on what they're spending and know exactly which applications or processes are costing the most.
- **Seamless software updates** – No more disruptions to users while implementing the next software upgrade. All cloud applications can be updated invisibly, behind the scenes, and stay always up to date.





Cybersecurity

Healthcare is in the midst of a cybersecurity crisis. In 2018, the healthcare sector saw 15 million patient records compromised in more than 500 breaches. That was three times the number of records that were compromised in 2017, according to the *Protenus Breach Barometer*. Halfway through 2019, *more than 25 million patient records were already breached*.

Challenges in cybersecurity

Among the biggest challenges for healthcare is understanding what systems, applications, and workloads are most at risk, and performing continual workforce training so that everyone can help counter threats:

- **Phishing** – This is still the top way that cybercriminals enter networks. Employees must be trained to recognize a phishing email or phone call, and when they've been targeted.
- **Socially engineered malware** – Cyberattackers are getting savvier, and putting out more enticing lures to get into systems. Employee training is critical to thwart new efforts.
- **Ransomware** – An increasingly problematic trend, especially among healthcare providers, ransomware attackers lock up systems and data, then refuse to unlock them without massive payments. Intrinsic security helps protect these sophisticated attacks.
- **East-west attacks** – Attackers already inside the network can move to other systems unless they are segmented and secured.

Opportunities in cybersecurity

If all this sounds ominous, it is. Healthcare organizations have to harden their defenses. And because they can't depend on conventional perimeter protections anymore to prevent, identify, and remediate cyberattacks, they should know about intrinsic security.

Intrinsic security involves embedding security controls directly into infrastructure, networks, and cloud workloads—the places where applications and data live—and taking advantage of the ability of the digital infrastructure to recognize the 'known good' behavior to block bad actors and protect the most precious digital assets. The benefits are many:

- **Fewer successful attacks** – Although attackers will continue to probe and test environments, fewer attacks will permeate defenses with an intrinsic security model.
- **Leaders in cybersecurity achieve higher growth** – By reducing the attack surface and providing unprecedented visibility into environments from endpoint to cloud, businesses succeed in larger ways. A *recent Forbes Insight study* found that 41 percent of security trailblazers reported annual growth rates exceeding 20 percent, compared with just 4 percent of laggards who saw such breakthrough numbers.
- **Protection as the network evolves** – Even as infrastructure and applications evolve—as new devices and apps enter the environment—organizations are protected because they're securing what's good, not chasing bad.



THE VALUE OF REAL-TIME CONNECTED HEALTHCARE

Protecting patient data is paramount for Interfaith Medical Center (IMC). The hospital wanted to share medical information via a patient portal while meeting compliance regulations and improving security for connected medical devices as IoMT transforms healthcare. IMC is solving these challenges with a zero-trust security model that protects applications and data against emerging threats—both internal and external—using micro-segmentation in addition to application control and behavioral monitoring.



Managing a Turbulent M&A Environment with Real-Time Connected Healthcare

“Leaders in legacy healthcare organizations are taking a longer-term view, preparing their organizations for the challenging days ahead by filling gaps in their own capabilities.”

ANU SINGH, MANAGING DIRECTOR,
KAUFMAN HALL

As healthcare M&A activities approach record highs, this means that all these technology opportunities and challenges are happening amidst a backdrop of an extremely volatile marketplace.

Mergers between large healthcare provider organizations have continued on a fiery pace since the beginning of 2018, *according to a recent report by Kaufman Hall*. The average size in revenue of sellers (the smaller of two organizations in a transaction) in 2018 reached \$409 million, the largest number witnessed since the firm starting tracking in 2008. The report also found a 14 percent CAGR in the average size of sellers by revenue between 2008 and 2018—and the trend doesn’t seem to be changing.

The reasons for the healthcare M&A frenzy are varied, but many are increasingly strategic in nature. Acquirers need specialized skills or services, and prefer to buy them rather than grow them from within. For example, some healthcare systems are looking to become specialists in a particular kind of care and are swooping down on clinics that specialize in heart transplants or behavioral health.

Technology giants like Google and Amazon entering the healthcare market—*behemoths with up to 10 times the annual revenues* of most healthcare systems—will continue to change the industry landscape. So will new partnerships designed to move care everywhere, such as CVS Health acquiring Aetna, Humana acquiring home-healthcare provider Kindred Healthcare, and Optum acquiring DaVita Medical Group, which operates 300 clinics in more than six states.

The value of real-time connected healthcare

A digital foundation supporting real-time connected healthcare helps ensure providers don’t lose out on important and potentially lucrative partnerships—or weaken and become M&A targets. For those in the midst of a deal, real-time connected healthcare helps successfully meld IT environments and apps—saving time, money, and leadership headaches.



Getting Started

Healthcare CIOs are living in interesting times. Profits have been sinking yet technological advances are poised to open never-before-imagined opportunities for revenue generation and cost savings. The challenge is navigating through the hype and promises, and building a digital foundation that can sustain innovation and constant change into the foreseeable future. By concentrating on enabling real-time connected healthcare, providers will meet today's challenges while being prepared for whatever the coming months and years bring.

Here are three ways to get started:

People. Get clinicians, administrative staff, and operations personnel ready for a major mind shift: from today's fee-for-service to tomorrow's value-based, patient-centric care.

Processes. Begin digitally transforming every process that touches patients—these are your customers—into one that prioritizes their outcomes, convenience, and comfort.

Technology. Modernize healthcare IT infrastructure with a digital foundation that supports any cloud, any app, and any device to improve flexibility, security, and scalability, all while managing risk.

Allow real-time connected healthcare to transform from a vision into reality to improve the cost, quality, and delivery of patient care while minimizing costs and staying competitive in a volatile marketplace.