A roadmap to Enterprise Intelligence

Accelerating the digital evolution of healthcare.

verizon business

What is Enterprise Intelligence?

From virtual consultations to digital twins, digital technologies are reshaping the healthcare landscape and redefining patient expectations. At the same time, rising costs are threatening to swamp profits, and providers must tackle new regulations and new cyberthreats. Change – and new disruptors – are everywhere you look.

Digital transformation is essential to building a more efficient, more agile and more successful healthcare organization; but it isn't enough. Leaders must embrace new ways of working and set out a strategy that brings together disconnected systems to create powerful, scalable platforms that enable innovation and order-of-magnitude change.

Old ways of working simply aren't up to the challenges of today. They are too expensive, too inflexible, and too hard to scale. The network is key to changing how healthcare operates. It enables providers to leverage the latest technologies – including artificial intelligence (AI) and machine learning (ML) – to generate unprecedented insight and make decision making smarter and faster. We call this Enterprise Intelligence.

In healthcare organizations, Enterprise Intelligence means enabling virtual multi-disciplinary consultations to make better use of scarce expertise and improve patient outcomes. It means connecting on-site first responders to clinicians, enabling new care pathways that help them limit the damage and loss of function associated with conditions like strokes. And it means tapping the vast quantities of data that often go unused to enable better epidemiology and more personalized care.

Organizations that achieve Enterprise Intelligence could be more agile, more resilient to events beyond their control, and ultimately more successful, both in terms of patient outcomes and financial performance. The insight that Enterprise Intelligence can help give healthcare organizations can lead to more confidence to act and a better ability to deliver for their patients.

Healthcare organizations could think like a startup while caring for all the things they typically need to worry about – like patient care, workforce shortages, regulatory change, thin operating margins and cybersecurity. Instead of fretting where the next 5% or 10% savings will come from, they could go looking for innovation that could enable them to achieve amazing things, like reaching twice as many patients, cutting readmittance rates in half or achieving near-perfect adherence rates. And they could capitalize on ideas quickly, not encumbered by legacy systems and inflexible networks.

In this paper, we look at the challenges facing healthcare organizations and how achieving Enterprise Intelligence can help solve them.

Contents

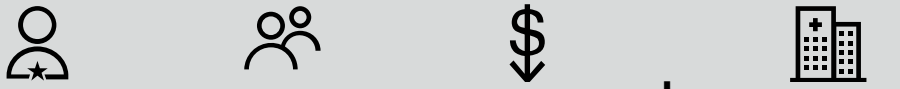
Executive summary

As a healthcare leader, you're familiar with the quality, cost, consumerization and competitive forces that are changing the healthcare landscape, including how care is delivered. This paper is about how technology can help healthcare organizations to achieve the sometimes competing objectives of increasing access, raising the quality of care, reducing the per-capita cost of care, and improving the experience for both patients and caregivers.

Our point of view has been shaped by our collaboration with leading healthcare strategists and technology providers that are building new solutions to meet the challenges that they face. We've enabled progressive organizations to innovate across their delivery systems. This in turn helps them to improve access to care, deliver better health outcomes and drive patient satisfaction, while making life easier for their clinicians and staff through more efficient processes and facilities. In this paper we'll explore what providers like this are doing to succeed in an environment where care is less centralized. Providing better experiences for patients and caregivers is more important than ever, and security measures can't be compromised.

The Quadruple Aim

In 2014, Doctor Thomas Bodenheimer proposed that the Institute for Healthcare Improvement's Triple Aim – improving the care of individual patients, promoting the health of populations and lowering healthcare costs – was lacking as it failed to account for physician burnout.[9]



He argued that quality patient care starts with the provider and proposed adding a fourth, physician-centred aim: improving clinical experience.

80%

A Redpoint Global survey found that 80% of consumers now prefer to interact with providers digitally.[7]

75%

Three quarters of users feel telehealth is better or about the same, in terms of quality of care, as in-person visits.[8]

Introduction

The digital imperative.

How would it affect the chances of survival and the future quality of life of a stroke victim if you could start treatment before they reach the hospital? How many more patients could you reach, and how many more lives could you improve, if you could extend care and monitoring services to the smartphones, health trackers and the other devices many patients carry?

These life-altering, even lifesaving, scenarios can be realized with remote patient monitoring, AI with analytics, telestroke services and ambulances fitted to function as mobile stroke units (MSUs).

While the Quadruple Aim remains the primary driver for most healthcare improvement efforts, digital and consumer influences are intractably woven throughout them. As hospitals and health systems are working to improve care coordination and make progress, market forces are undermining these efforts. As patients gain more options for in-person and virtual care, within or outside a provider network, the potential for patient data to be trapped in silos and the coordination of care to be compromised increases.

Making better use of information is a key enabler to addressing today's needs and opportunities, and therefore increasing the pace of digitalization is the overarching imperative.

The leading challenges in healthcare include:

Disruption to the provider/payer ecosystem and shifting care delivery models.

Consumerization and evolving expectations for patient and clinician experience.

Complex intersection of connectivity, security and quality of care.

Prioritization of innovation initiatives to address limited staff and financial resources.

Healthcare organizations need to do a lot of things to address these challenges, but there is a critical first step they need to take that will help address them all. By focusing on modernizing their enterprise infrastructure, they can position their organization to support digital initiatives across the delivery continuum to drive operational efficiency, address workforce shortages, transform care delivery models and reach quality outcomes goals.

Health systems have the opportunity to build an agile, scalable infrastructure that supports smart, connected care delivery and information-sharing in the hospital, to the patient home, and across other critical patient care and engagement touchpoints. By taking these steps today, organizations can enhance the performance and value of telehealth, patient engagement and other digital health systems, while positioning themselves to quickly scale new locations, add new partners and services, and pursue future innovations.

The obstacles to transforming care delivery.

Emerging care models, including retail care, payers serving as providers, expanded telehealth services and new for-profit providers are making care arguably more fragmented. Meanwhile, private equity firms are pouring billions into the sector to encourage innovation, disruption and competition. Providers need to address this reality by offering their own options for distributed care and positioning themselves – through strategy, policy, and infrastructure changes – to lead ecosystem transformation and not just respond to it.

Concurrently, they need to extend cybersecurity protection to these new care environments and data sources and improve its effectiveness against hackers and other threats. Organizations have long struggled with balancing access to information to support care coordination in real time against the need to lock down protected health information to insulate systems and patients' data from malicious actors. Multiple factors are making that even more complex and problematic today. As hospitals become more wireless and modular, connected devices and IoT sensors more prominent, and care more distributed across the care spectrum, the attack surface widens and vulnerabilities multiply. This makes attaining the optimal security-access balance even harder. Plus, it has become more important to provide convenient provider and patient experiences, without compromising on security.

Consumerization

The impact of consumerization on healthcare delivery cannot be understated. Patients increasingly expect the same convenience services from their healthcare system that they get from their favorite retailers. That means 24/7 access to online information and booking services; easy, but secure, access; personalized experiences; and on-demand delivery. It can be difficult for healthcare providers to match the convenience offered by other organizations, putting pressure on patient satisfaction. Therefore, efforts to improve the patient experience must extend to new patient touchpoints – addressing digital doorways; offering patients telehealth options; extending services into non-traditional settings, such as shopping malls; and, when they do visit a clinic or hospital, supporting them with wayfinding from the moment they arrive.

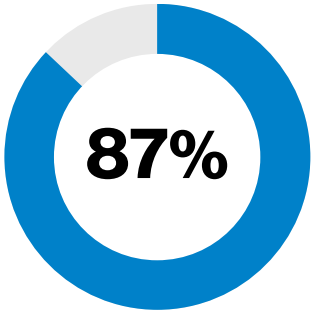
Fundamentally, providers must be prepared to deliver care wherever patients want it – regardless of:

- Location – in a healthcare facility or remote, such as at the patient home
- Channel – in-person, telehealth, hybrid, etc.

Health systems are addressing this in a variety of ways. One is by exploring the hospital-at-home (HaH) model, which brings with it many new considerations for security, connectivity and changing staff roles.

Meanwhile, efforts to improve user experience can't be limited to patients. The shortage of doctors, nurses and other clinicians and their high burnout rates were already significant problems even before the pandemic. Depending on how they are deployed, technologies like telehealth, AI-based tools and other innovations can be a help or a hindrance to attracting and retaining staff and keeping them satisfied and productive.

Record keeping and administrative systems – including time spent on electronic health record (EHR) systems and workflows that are badly integrated or not integrated at all – can be significant sources of job dissatisfaction. The "swivel chair effect," where physicians must toggle between multiple screens during a patient interaction – for example, having to use different devices to talk with the patient and review their records during a telehealth session – are a significant source of frustration.



87% of U.S. hospital and health system leaders responded that COVID-19 had led them to rethink IT design of their hospitals to better support operational response.[6]

Disruption

Payers are becoming providers, as are retail pharmacies and online retailers. New market entrants may execute better than the status quo on any aspect of the Quadruple Aim, whereas legacy providers must focus resources and innovation on all aspects of the aim, which puts their patient satisfaction and market share at risk. As roles between payers and providers, retailers and health systems increasingly become blurred, the future regulatory and reimbursement landscape is also fuzzy.

These emerging sources of care plus retail clinics, online-only services, independent labs that offer direct-to-consumer COVID-19 and other tests, and other unaffiliated providers may both partner and compete with hospitals and health systems. The migration of care services away from hospital epicenters and closer to people and communities is addressing health equity in transformative ways, but decentralization can create information silos.

Where there is no alignment with a patient's primary care provider or health system, these and other siloed systems can prevent health information exchanges (HIEs), patient portals, EHR systems and emerging patient health record (PHR) ecosystems from delivering on their promise for true health system interoperability. The broad range of patient touchpoints and evolving relationships among them make it necessary for providers to be able to share information quickly (without compromising security) to ensure continuity of care.

Interestingly, some disruptors are trying to bring back the house-call model by supplementing telehealth encounters with a doctor, nurse or other clinician making follow-up visits. This comes at a time when the use of telehealth and patient preference for it are at all-time highs. Hospitals are deploying HaH programs to move low-acuity services out of the hospital and into the home. Fire services are launching community paramedic programs, leveraging their knowledge and access to chronic disease patients to decrease ER and hospital admissions. Many of them are also using telehealth solutions as part of that model.

With the progress being made in remote patient monitoring equipment and consumer wearables, plus the popularity of cloud and consumption-based services, how long will it be before we see remote, digital Chronic Condition Management as a Service? What other competitors to traditional health systems will exist five years from now?

Disruption is also ongoing on the policy side. A key reason why the use of telehealth boomed during the pandemic was that legislators temporarily lifted restrictions on the types of services that were permissible and reimbursable. These policies were temporary, and although there is support and legislative activity aimed at extending them,[1] what the future holds for making these changes permanent and sustainable — especially where telehealth reimbursement and licensing requirements are concerned — is still uncertain.

The pandemic was also a catalyst to unlock millions in government funding to expand broadband access to rural and other underserved patient populations. Whether these investments are temporary or become the building blocks for a more connected national infrastructure remains to be seen.

Security, connectivity and continuity of care

New data sources, including unaffiliated providers, remote patient monitoring equipment, and consumer fitness devices and apps are a largely untapped potential resource. The resource can only become valuable if providers can develop systems to collect, manage, analyze and secure the data, then securely communicate the insights where and when needed.

Many hospitals already have some elements of smart facilities, for example real-time locating systems (RTLS) for medical device and other asset tracking, monitors in patient rooms, and perhaps occupancy and flow sensors. Most hospitals do not go as far as integrating these inputs and applying analytics to gain insights that could inform improvements to processes and operating efficiencies.

All these new touchpoints need to be secured, and health systems need to ensure their security policies are consistently enforced regardless of whether the device or interaction is in the hospital, the patient's home or anywhere in between.

Digital inclusion

Healthcare providers must plan for a more digital, connected future while keeping an eye on digital barriers. Addressing digital equity is critical to this evolution so that connected healthcare does not become the privilege of an elite few. According to the American Hospital Association's 2022 Environmental Scan:

- One in five Americans live in rural areas
- 14.5 million Americans lack access to fixed broadband service at threshold speeds
- 13.9% of urban households and 19.2% of rural households cannot afford a broadband subscription[2]

Next-gen and legacy communication technologies will need to coexist in the more digital and decentralized patient care environment of the future. The digital divide persists, and providers must make progress in closing it so they can make progress against the Quadruple Aim.

14.5 M

Approximately 4.5% of Americans lack access to fixed broadband service at threshold speeds.[5]

Prioritization

If providers could connect their existing silos and access data from new sources, such as expanded remote patient monitoring, would their networks and computers have the bandwidth to effectively process all the data? What if AI and analytics were applied? Can all these sources and endpoints be secured? Many innovation initiatives end because these questions can't be answered to the satisfaction of IT and risk management leaders.

Hospitals and health systems understand they can benefit from new digital solutions, but must be satisfied that utilization will be sufficient to justify the investment. You must be convinced that digital investments will provide outstanding value compared to the other options for investing to deliver value-based care.

"The healthcare industry, driven by value-based care and increased consumerization, is set for a paradigm shift that will put a much greater focus on connectivity and access to data."

Scott D. Boden, MD
Vice President for Business Innovation
Emory Healthcare

Prioritization efforts also need to acknowledge the persistent IT talent shortage. Any upgrade or new digital solutions that will require a significant integration effort, or will introduce undue new cybersecurity risk, will be difficult to justify. Before prioritizing specific solutions, providers need to position themselves for sustained success for the future environment where telehealth and other digital touchpoints will play a larger role.

For example, 2022 is likely to be the first year when both a majority of health systems offer telehealth services, and a majority of patients are willing to use them. Many health systems are planning to emphasize chronic condition management and expand remote-patient monitoring in their telehealth programs to improve patient outcomes. This will significantly increase bandwidth and data management requirements. This is one example of why technology, clinical and strategic initiatives need to be closely aligned.

A roadmap for healthcare transformation

Now is the time for providers to make smart technology investments to accelerate digital transformation to thrive in the new digital economy and fend off threats from both familiar and non-traditional competitors.

While health systems know this is the right way forward, they face several challenges. They have a multitude of pain points and must juggle numerous priorities. And many have limited resources – the U.S. healthcare industry experienced a $54 billion loss in net income in 2021.[3]

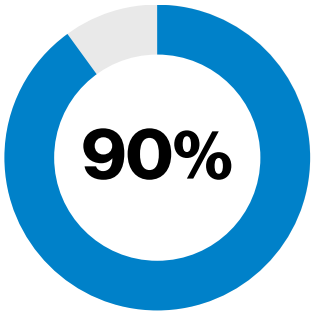
Providers have numerous technology-driven options to improve clinical, administrative and patient engagement performance. Some, like telehealth and RTLS, are already well proven to provide quality and cost benefits. Many other offerings are starting to show tangible benefits, such as:

- Extended reality (XR), including augmented and virtual reality (AR/VR), to improve staff training
- AI-enhanced diagnostics and clinical-decision support
- Remote monitoring and patient adherence technologies

It starts with infrastructure. It's crucial to build the framework from the foundation up, but this must be done with the end in mind. Transforming infrastructure will fundamentally depend on the end goal, the picture of a smoothly running operation where innovation roadmaps are fully realized. The use cases that have the greatest potential to drive health outcomes and improve operational efficiency must be landmarked to that roadmap. The following present considerations for establishing a communications infrastructure to meet current and future needs. We also present innovative use cases that a modern infrastructure enables to support connected hospitals and improvements in patient engagement and patient care. Only by connecting all the domains can healthcare providers meet people where they are, enable the entire wellness journey, and most effectively use technology to enhance relationships rather than replace them.

Modern healthcare services need the backbone of a modernized infrastructure that's built to reach patients however they want to be reached – inside or outside the hospital, in person or via their choice of device. Enabling patient engagement and care anywhere requires more flexibility, bandwidth, native intelligence and embedded security than previous generations of infrastructure support.

With a modern infrastructure, providers can improve patient care, deliver patient and clinician satisfaction, drive efficiency and lower cost in the system in many ways. The figure on page 11 illustrates our vision for the connected hospital of the future. Realizing this begins with connectivity road-mapping and ensuring hospital leaders have a comprehensive connectivity plan in place. Then the organization must put in place the right connectivity infrastructure–such as private networks, network-as-a-service and edge compute capabilities – to enable the delivery of operational and care delivery solutions such as those shown on the next page.



COVID-19 put momentum behind these plans. A study by HIMSS found that 90% of hospital leaders had accelerated their digital transformation in response to the pandemic.

Verizon's connected framework for intelligent, real-time hospital operations and care delivery

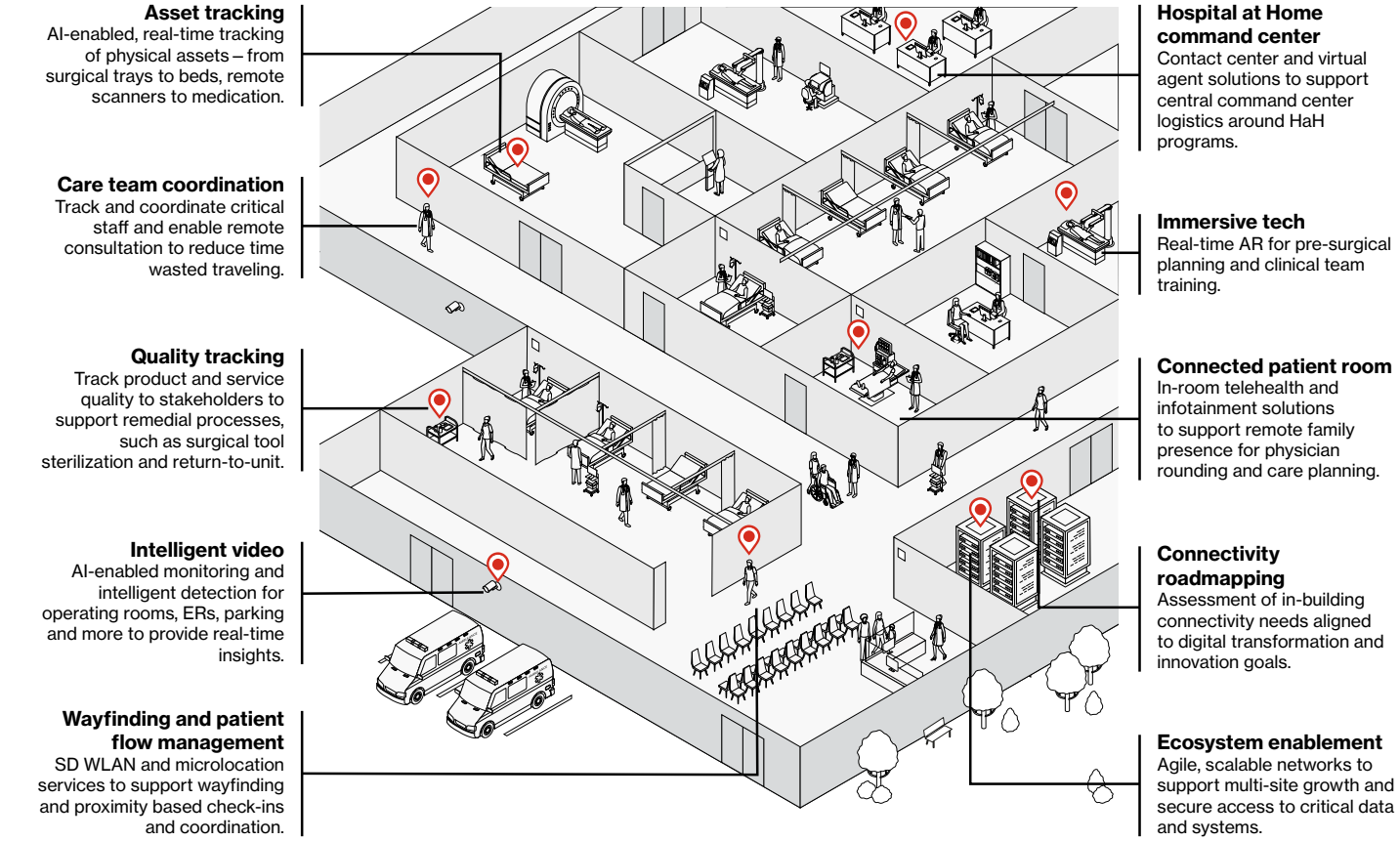


Figure 1: The connected hospital of the future.

The following sections profile proven and emerging use cases for connected care, connected patient experience and connected hospitals. Some of these can be executed with legacy wired and wireless network infrastructure; others depend on the higher bandwidth, lower latency and stronger security that 5G networks and edge computing provide.

Key definitions

Edge computing
This is a network architectural model that brings technology resources (including compute and related infrastructure) closer to the end user and automated devices where the data is generated and consumed. It's a decentralized extension of cellular networks where the data is processed and stored at the edge and only certain workloads are transmitted to centralized networks (like the cloud).

Private 5G networks
Because private 5G networks are enterprise-specific, they are segregated from public networks – cellular communication stays on premises – and can be configured to the organization's specific security and performance requirements. Private 5G networks enhance organizational capabilities by providing high bandwidth, low-latency coverage that can support scaled implementation of AI and machine learning, virtual and augmented devices, remote monitoring and other networked devices.

Setting the technology foundation.

Providers should focus on planning and implementing the future infrastructure they will need to succeed in the new more distributed, digitally driven patient-care model. The individual solutions they pursue to support their specific organization's objectives can only be as effective as the underlying infrastructure.

As a leader in safeguarding health information in traditional and emerging environments, and a partner to many leading and innovative health systems, Verizon has developed a vision for health systems to succeed in the connected health future by modernizing with the building blocks shown below.

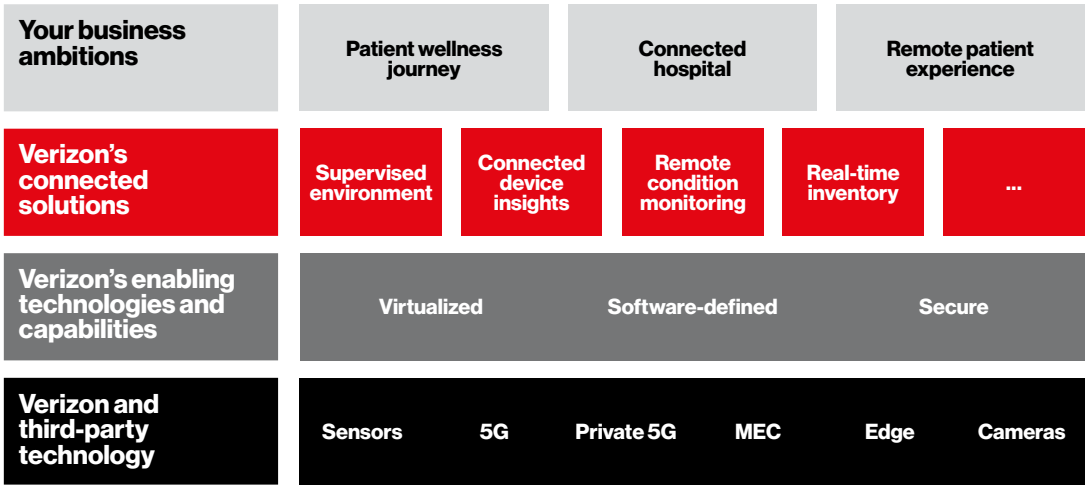


Figure 2: Design elements to succeed in the connected, digital future

This design does not represent an either/or option to existing communication systems, because a "one-size-fits-all" approach is inappropriate for hospitals and health systems. This becomes clear when organizations begin formally studying and planning for future connectivity needs, which usually call for an interoperable mix of current systems and enhanced capabilities. The foundation for these and other decisions is a comprehensive connectivity plan that is aligned with the health system's innovation roadmap. The best plan for an existing facility won't likely be best for a new one being constructed, so flexibility within a standardized framework is essential.

The connectivity plan to support infrastructure transformation could include private cellular networks (like private 5G), Wi-Fi 6 and even distributed antenna systems (DAS), depending on:

- The density of the physical infrastructure
- The use cases that need to be deployed, real-time applications and "things" that need to be connected
- The environment and the obstacles to door-to-door and floor-to-floor connectivity, inside or out

MEC infrastructure is needed to effectively orchestrate a high density of sensors and devices and process large volumes of data per sensor, such as when applying AI. These systems demand and respond with almost zero latency.

Most hospitals will not need a complete "rip and replace" program, but they will likely need some new components for their current communications infrastructure. Current wired and Wi-Fi infrastructure will remain effective for some systems and locations. Therefore, organizations will need to ensure interoperability, including for security standards, across new and existing elements.

The pressing question, of course, is how to get from here to there. How do we get to the connected future of healthcare where all of these emerging capabilities can be seamlessly deployed in real time to transform care delivery in powerful, necessary ways?

Some of the ways these technologies can be brought together in healthcare to enable providers to improve access to care, patient engagement and outcomes while reducing costs are presented in the following sections:

- **Connected patient experience**
- **Connected care**
- **Connected facilities**

Connected patient experience

Today's patients are always just outside the "front door" of the health system because they carry it in their pocket on their phones, or step through it via their computers. Providers need to make use of these touchpoints to support patient wellness, population health and patient engagement to the levels that modern, value-based care demands. Patient portals and telehealth services are an excellent start, but today they are rarely differentiators. New use cases and engagement points need to be established to achieve differentiated experiences and more effective care.

Some of the established and emerging ways to do this include:

Coordinated community support
For example, creating an app that enables convenient scheduling of appointments, check-ins and secure messaging, all with single sign-on and secure data exchange across various portals, apps, systems and devices.

Remote patient monitoring
For example, enabling data gathering from medical-grade sensors supplied by the provider and patient-owned wearables and apps and consolidating into a single view.

Virtual coaching and therapy services
For example, using extended reality (XR) – including augmented and virtual reality technologies (AR/VR) – to create immersive experiences for clinician training or treat conditions like PTSD.

Expanded telehealth and virtual care offerings
For example, leveraging next-gen telehealth to enable HaH programs and remote/virtual patient monitoring, chronic disease management, mental/behavioral health counseling and post-procedure follow-up.

On-site care services navigation
For example, using interactive wayfinding to guide patients throughout a visit – from turn-by-turn directions to a convenient parking spot to step-by-step directions to a specific location.

The potential benefits of these solutions include reduced patient anxiety, increased attendance rates, more positive patient experiences, and improved satisfaction ratings and outcomes.

Connected care

Health systems are pursuing capabilities to make their locations more intelligent and connected, though many of these programs are in the pilot stages.

The areas of most interest and greatest potential include:

Artificial intelligence (AI)/machine learning (ML)
For example, connecting data from the EHR, health information exchanges, medical devices, wearables, sensors and other disparate sources and applying AI to the data sets to inform and assess care protocols, develop population health strategies and guide other policy and process changes. Potential benefits include accelerated diagnoses, improved accuracy and increased efficiency. These technologies can also enable robotic surgery and the automation of various administrative functions.

Telehealth
For example, retrofitting patient rooms to accommodate telehealth services – something many hospitals and clinics are doing as the use of virtual and hybrid models grow rapidly. As well as using connectivity for in-room telehealth services – such as enabling patients and clinicians to consult with remote specialists – it can help improve the patient experience, including allowing virtual visits and enabling family members to be involved in discussion with clinicians. Potential benefits include improved outcomes, better patient engagement, improved employee experiences and increased patient satisfaction.

Sensors
For example, deploying sensors to monitor patients, safety and assets in real time. Alarms can then be set for anomalous or dangerous situations – such as patient falls, people entering areas they aren't authorized to and unauthorized equipment movements. Potential benefits include improved safety and reduced theft.

Extended reality (XR) – including augmented and virtual reality (AR/VR)
For example, using AR/VR components to create immersive training experiences and simulations. Devices like "see what I see" glasses can also be used in real-time to provide access to scarce expertise. Potential benefits include accelerated diagnostics, reduced mistakes, better use of expertise and improved employee experiences.

Connected facilities

Many of the principles for improving patient care through new information sources and better connectivity can be adapted to improve facility operations:

Location
For example, using sensors, facility-wide wireless coverage, and real-time locating systems (RTLS) to track anything from expensive medical equipment to consumables in real time. Potential benefits include cutting the time taken to get vital equipment to the right location, improving material flow, increasing asset utilization, enabling lower safety stocks without jeopardizing care and reducing theft.

Occupancy
For example, using networked people counters, occupancy sensors and video cameras to monitor people flows. With the power of edge computing and AI, real-time predictive analytics can be applied to drive numerous benefits, including improved space utilization (including implementing social distancing when required), increased energy efficiency (heat, light and services can be turned off when not required) and enhanced security.

Condition
For example, using connected, intelligent devices to implement predictive maintenance. Devices – embedded or retrofitted – can perform self-diagnostics and issue notifications for when updates or maintenance are needed. Benefits can include extended asset lifetime, reduced downtime and maintenance costs, reduced consumables costs, enhanced device performance and reduced rework (for instance when scans need to be repeated). Connected device monitoring can also deter cybersecurity threats when the proper protections are applied.

There are many more examples of secure, connected, intelligent applications that are in use and in development. Verizon is helping, by providing expertise, solutions and underlying technology to connect and secure people, devices and information across the care continuum.

Next steps

As providers embark on the road to digital transformation, one of the steps is to identify opportunities for transformation where early value can be unlocked. Verizon has developed a framework that helps our customers identify these opportunities in a simple, two-step approach. Step one is to identify the optimal connectivity technologies to support the desired use cases. Step two is to conduct a readiness assessment for folding those technologies into existing operations.

Connectivity technology selection

Identifying the connectivity necessary to support key use cases should be the jumping-off point. Many connectivity options are available – such as Wi-Fi, 4G, 5G, MEC and others – and it's important to base decisions on quantifiable parameters that are relevant to the use case. Verizon's framework considers three key aspects:

Performance

Technical requirements such as network bandwidth, latency, compute power and device density.

Privacy and compliance

Issues like data residency, data sovereignty, privacy and regulatory compliance.

Availability

Considerations like availability of spectrum, cost and local regulatory constraints.

These factors together lead to several choices for an optimal connectivity technology, including wired or wireless and public or private. The list of options can be further reduced by considering the operational cost of the transport, assessing the use of backhaul traffic and calculating the capex requirements.

Deployment readiness evaluation

The next step is to perform a deployment readiness evaluation by analyzing what it will take to develop and deploy the use case. Key considerations here are:

- **Capabilities**
  A review of the internal platforms and systems that are available to support the use case. Missing capabilities may be developed internally or sourced from a partner.
- **Device readiness**
  Identification of the readiness of existing devices intended to be included in the use cases. The need for costly replacement or retrofitting could inhibit deployment.

The figure below shows how Verizon can help address these questions.

Verizon's connected solutions	• **What solutions are currently available?** • **How can they be connected and leveraged?**
Verizon's enabling technologies and capabilities	• **What technology enablers are essential to the use case?** • **Are internal platforms/systems capable of supporting these?** • **What new capabilities must be developed/outsourced?** • **Who are the key partners we will work with?**
Verizon and third-party technology	**Based on the connectivity technology choice:** • **What new hardware/network infrastructure will be required?** • **Will devices need to be upgraded?**

Figure 3: Readiness evaluation questions to investigate.

The partner you need.

It's easy to say that you have extensive global industry experience, but how many providers can back it up? Our experience in healthcare includes working with 185 organizations. We have helped many of them to develop and implement successful programs that are improving quality, access, patient and provider experiences, and cost-efficiency within health systems and the Care Anywhere model.

With Verizon, organizations have a strategic partner. Our networks – including America's most reliable 5G network[4] and one of the world's largest and highest performing global IP networks – are among our greatest assets.

Verizon maintains the Vocabulary for Event Recording and Incident Sharing (VERIS) database and publishes many highly respected cybersecurity reports, including the annual Data Breach Investigations Report (DBIR). While many companies have visibility into the IP addresses of some bad actors, Verizon has visibility across its entire network of customers served. This enables us to design and secure systems from a wide variety of current and emerging threats. This capability is especially relevant when securing operations technology (OT) environments.

While Verizon's deep insight will surely prove highly valuable, the future will undoubtedly bring changes that require even greater cybersecurity knowledge and measures. Emerging technologies challenge existing cybersecurity techniques. For instance, quantum computing could break the encryption currently used by e-commerce and virtual private networks (VPNs). This could enable bad actors to decrypt vast data lakes collected over decades of clandestine operations, giving them critical insights, and, most worryingly, access to embedded systems that are still in operation today. The race is on to develop quantum-safe algorithms and procedures before that happens. Verizon is trialing the use of next-generation cryptographic keys so that when quantum threats emerge in the real world, we will be ready.

We're a world leader in cybersecurity, including preserving authorization boundaries, controlling cost, assuring predictable execution and managing supply chain risk. We understand how to apply network scanning, anomaly detection, segregation and other security techniques across OT and IT networks to improve protection and performance.

Our customers also benefit from the billions that we have invested in developing the platforms, technologies and solutions that organizations need. But our greatest strengths are our vision, our people and our proven ability to deliver.

The network can be a multiplier, increasing the value of your investments and expanding your capabilities. The combination of our advanced networks, cutting-edge solutions, and professional and managed services can connect systems across your enterprise to empower you to overcome the business challenges that you face. We can connect all of your ecosystem, bringing users and applications together, to achieve all that you can imagine.

We call the result Enterprise Intelligence. It can make you more efficient, more agile, better prepared for unexpected challenges, and ready to seize new opportunities.

Our platforms could help you achieve your goals. To find out more about our capabilities and experience in the healthcare sector, visit verizon.com/healthcare.

To learn more about achieving enterprise intelligence, visit our website:

verizon.com/enterpriseintelligence

1 House resolution 4040 (The Advancing Telehealth Beyond COVID-19 Act) was passed by Congress in August 2022

2 American Hospital Association, 2022 Environmental Scan, 2022

3 American Hospital Association, 2022 Environmental Scan, 2022

4 **Most reliable 5G network based on more first place rankings in RootMetrics® 5G data reliability assessments of 125 metro markets conducted in 1H 2022. Tested with best commercially available smartphones on three national mobile networks across all available network types. Your experiences may vary. RootMetrics rankings are not an endorsement of Verizon. Visit rootmetrics.com.**

5 American Hospital Association, 2022 Environmental Scan, 2022

6 HIMSS Market Intelligence, Reimagining the Connected Hospital of the Future, 9 May 2021

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