

# The future of healthcare is 5G.

Use case

Discover some of the ways that 5G could help you overcome challenges and empower better, more cost-efficient patient outcomes.

Healthcare is being reshaped by technology. Providers now have better access to patient data and applications than ever before, implanted devices and wearables deliver critical information about remote and mobile patients, and telemedicine is bringing much-needed care to underserved communities. And those are just a few of the new capabilities gained in recent years.

Still, true transformation has yet to arrive.

But it's on its way. Are you ready?

Following are some of the challenges that healthcare organizations face today, and how 5G technology could help solve them.

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## Technology challenges facing healthcare organizations



### Collecting, managing and utilizing Big Data more efficiently

Big Data in healthcare—the health data amassed from electronic health records (EHR), medical imaging, payer records, patient portals and ever-increasing other sources—has advanced the industry on many fronts. However, it has also created a whole new set of challenges, as organizations struggle to efficiently collect, manage, secure and utilize massive volumes of data that's highly variable in format, type and content.



### Improving patient outcomes

The pressure to improve patient outcomes grows increasingly intense as the industry continues to move toward value-based care. Potential solutions include making better-informed diagnoses, reducing medication errors, providing better access to care, and engaging and supporting patients after discharge.



### Securing data and improving compliance

As technology becomes increasingly enmeshed in healthcare, the difficulty of securing vast amounts of data grows apace. And mishandling data can lead to noncompliance with HIPAA regulations, bringing significant financial penalties and costly, reputation-damaging data breaches. In fact, healthcare data breaches are the costliest of any industry, averaging \$408 per record.<sup>1</sup>



### Delivering better patient experiences

As patients are urged to assume more responsibility for their wellness, and leverage tools to measure and manage their health electronically, expectations for better healthcare experiences rise. Today's healthcare consumer wants a streamlined, connected healthcare system that provides faster, easier, 24/7/365 access to acute care, follow-up care, personal health information, detailed costs and other helpful information.

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## How 5G will transform healthcare

5G will help take healthcare technology to the next level, thanks to next-generation network capabilities, including:

- **Speed**

5G has the potential to deliver peak data rates of up to 10 Gbps, allowing clinicians and researchers to rapidly access and transport massive amounts of data, such as medical imaging and large data tables. This could help clinicians, researchers and others in the field work smarter, faster and more productively. 5G also has the potential to power a new generation of collaboration and productivity tools. Ubiquitous mobile access to virtual reality, 4K video streaming and haptics could take teleconferencing to the next level, enabling distributed care providers, patients, vendors and partners to work together more effectively and collaboratively.

- **Latency**

5G's ultra-low end-to-end latency (the time it takes for data to travel from the user, over the network to the central processor and back again) will be one of the drivers of true technological change, bringing data transit speed to many times less than the blink of an eye. This will be transformative for assisted surgery and augmented imaging applications

- **Data volume**

The 5G standard is designed to support up to 10 TB/s/km<sup>2</sup>. This means that a 5G network can carry a massive amount of data for a large number of simultaneous users. So users in high-density areas—like hospitals—will all experience the fast speeds and low latency of 5G service

- **Massive connectivity**

5G will be capable of supporting up to 1 million devices in a square kilometer, which could greatly expand the use of wearables and portable monitoring

- **Enhanced data security and privacy**

Security has improved with each successive wireless network evolution and 5G will deliver even more robust security for mobile devices,<sup>2</sup> helping organizations better manage HIPAA compliance through:

- **Communication security**

5G will encrypt signaling traffic, and inherits well-proven security algorithms, such as separation of keys, backward and forward security for keys at handovers, idle mode mobility, and secure algorithm negotiation. New features will include automatic recovery from malicious algorithm mismatches and fast synchronization of security contexts in access and core networks

- **Identity management**

With secure identity management and a new authentication framework, 5G will allow more flexible and robust authentication. It will also facilitate reuse of existing public keys and certificate infrastructure for network access authentication

- **Privacy**

Subscriber privacy for data traffic, phone calls and text messages will be included in 5G, by using state-of-the-art encryption. The devices and the network will mutually authenticate each other and use integrity-protected signaling

- **Security assurance**

This will help ensure that network equipment meets security requirements and is implemented following secure development and product life-cycle processes

- **Resilience**

5G is expected to be more resilient to cyberattacks and nonmalicious incidents, because the core network architecture is designed to support network slicing, continuous secure connectivity for mobile devices and lower latency

**“There’s no question that the infusion of 5G into healthcare will enhance access to care, while decreasing costs and improving efficiency.”**

–The College of Healthcare Information Management<sup>3</sup>

## How 5G could empower healthcare innovation

5G is not just the next step in cellular communications networks. It is a transformative platform that will support healthcare technologies and use cases that were previously unimaginable, by utilizing:



### Artificial intelligence

The use of artificial intelligence (AI) is likely to skyrocket with 5G, as 5G's speed, ultra-low latency, ultra-wide bandwidth and edge computing power will enable the rapid collection, processing and analysis of massive amounts of data. Leading-edge organizations are already using AI to create more intuitive EHR interfaces and automate record keeping and data security processes, as well as to gain unprecedented insights into diagnostics, care processes, treatment variability and patient outcomes. It can also be used for risk scoring, infectious disease management and control, and in the development of next-generation drugs, tools and treatments for cancer and other diseases.

In the future, brain-computer interfaces (BCIs) backed by AI could also restore speech and movement, improving quality of life for patients with spinal cord injuries, ALS, strokes, locked-in syndrome and other neurological diseases and injuries.



### Intelligent video

Video technology integrated with analytical software promises to take telemedicine, remote care, collaboration, training and hospital management to the next level. Intelligent video can recognize objects, behavior and anomalies and then deduce how best to act upon them. This could enable faster, more accurate remote diagnostics, more effective real-time collaboration, and improved remote and post-operative patient care. It could also improve onsite patient care by alerting staff when patients require assistance or have been left alone beyond a specified timeframe. It could also be used to analyze and improve staff performance and training and optimize staffing by tracking behavior and activity throughout the facility during different times of day.



### Internet of Medical Things

With 5G, connected devices—particularly wearables and implants—will become even more pervasive, transmitting a wide variety of critical information to care providers. We're already seeing stories of doctors alerting patients with implants of impending problems and consumer wearables warning people of irregular heartbeats. Other types of Internet of Medical Things (IoMT) devices could be used for disease prevention, remote intervention and wellness promotion, and include home-use medical devices, point-of-care kits and mobile healthcare applications. In the future, ingestible, wireless-enabled digital tools could help monitor healing and treatment and drug efficacy.



### Multi-access edge computing

Multi-access edge computing (MEC) enables cloud servers to run closer to endpoints, reducing latency and speeding local processing. That means the majority of computing can take place at the network edge, rather than on devices. This could lead to the creation of low-cost, lightweight wearables and medical devices that leverage complex capabilities such as analytics, AI, computer vision and mapping located at the edge. Plus, adding data centers to the edge can reduce transmission and processing times, so clinicians can respond more quickly to changes in condition. It can also help organizations more effectively deliver applications and services, such as telemedicine, to remote areas where network services are limited. And MEC reduces exposure of personal health information and other critical data, by minimizing how often it's transmitted to the cloud.



### Robotics

Robotics have been used in healthcare for over 30 years, ranging from industrial robots that perform routine tasks, like sterilizing rooms and delivering supplies and equipment, to devices that assist with and perform surgeries. They can also transport dangerous substances and aid in the care of patients with highly contagious diseases like Ebola. With 5G—and in concert with AI—their uses could radically expand, making them ubiquitous in diagnostics, surgery, physical therapy and rehabilitation, telemedicine, home care, and elder care. In the future, robotic nanodevices could be injected into the body and automatically guided to deliver treatment payloads, take samples or make repairs.



### Virtual reality (VR), augmented reality (AR), mixed reality (MR) and extended reality (XR)

With 5G, immersive technologies will be transformed from entertainment platforms to valuable healthcare tools. From hyper-realistic training environments to rapid prototyping, 3D modeling and printing, data visualization, and patient care, 5G will unleash the power of immersive technologies, empowering new capabilities, instilling new levels of understanding and empathy, and enabling improved efficiencies across the healthcare ecosystem. In the realm of patient care, they promise to reduce anxiety before and during treatment, ease pain, advance physical therapy, speed recovery and aid in end-of-life care.

## 5G is coming to the healthcare industry.

### Are you ready?

To realize the full potential of 5G, we recommend collaborating with your trusted network partner to map your path today. According to recent Ericsson research, healthcare officials place telecom operators at the top of the list when it comes to partnerships—even placing them above pharmaceutical companies and application developers.<sup>4</sup>

Seeing how your current technology portfolio aligns with your industry's average can also be helpful. The Verizon 5G readiness and technology adoption assessment will guide you through 14 questions drawn from a nationwide survey of more than 1,500 small, medium-sized and enterprise businesses. You'll receive a personalized report based on your responses, identifying key technologies that could help you sharpen your competitive advantage.

The readiness assessment will be particularly helpful if you're looking to be an early adopter of 5G, as it identifies 4G LTE technologies that you can invest in now to streamline the transition. 5G will be phased in gradually, and interoperate seamlessly with 4G LTE Advanced for years to come, protecting and future-proofing your investments.

**Take the free 5G readiness and technology adoption assessment at [info.verizonwireless.com/b2b-5g-assessment-tool.html](https://info.verizonwireless.com/b2b-5g-assessment-tool.html)**

## What makes Verizon 5G Ultra Wideband different?

At Verizon, we're building a different kind of network. One that will deliver on the promise of today's new technologies, unlocking their full potential and paving the way for a new era of healthcare innovation.

There are four key elements that make Verizon 5G Ultra Wideband different from our competitor's 5G networks.

### 1. Massive fiber resources

Verizon has spent years deploying a massive fiber network while it densified its 4G LTE network with fiber-fed small cells. This fiber network is integral to delivering a revolutionary 5G network

### 2. Small cell deployment

Verizon has also spent years installing new small cells to densify its 4G LTE network. Many 4G locations will be used for 5G. This installation and densification effort has required extensive coordination with local governments

### 3. Critical spectrum holdings

Verizon has secured a large portfolio of millimeter-wave spectrum through company and license acquisitions to help ensure that customers receive the best 5G network experience

### 4. Edge computing

We have network locations nationwide that are ideally suited to housing edge computing resources. Compute at the edge will deliver access to the tools, power, real estate and expertise to deploy at scale

## The Verizon 5G future has arrived.

You'll find an always-current list of cities with Verizon 5G Ultra Wideband at [verizonwireless.com/5g/coverage-map/](https://www.verizonwireless.com/5g/coverage-map/)

For information on 5G Home availability, visit [verizonwireless.com/5g/home/](https://www.verizonwireless.com/5g/home/)

## Learn more:

Contact your Verizon Wireless business specialist to begin building a technology infrastructure that increases productivity and empowers more effective and efficient patient care. Or log on to [verizonwireless.com/biz/5g/](https://www.verizonwireless.com/biz/5g/)



1 <https://www.hipaajournal.com/healthcare-data-breach-costs-highest-of-any-industry-at-408-per-record/>

2 <https://www.ericsson.com/en/white-papers/5g-security---enabling-a-trustworthy-5g-system>

3 <https://chimecentral.org/wp-content/uploads/2019/02/CHIME-Statement-on-Senate-Commerce-5G-HearingvFINAL.pdf>

4 <https://www.ericsson.com/en/networks/trending/insights-and-reports/5g-healthcare>