Can your health system's bandwidth keep up?

How new tech innovations are impacting bandwidth demands

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Hospitals and health systems must have a powerful digital health infrastructure and reliable and scalable bandwidth to support the transmission of data across connected technologies.

Major advances in wireless technology, miniaturization of electronic products and devices and computing power are driving healthcare technology innovation. These advances have increased the number of connected medical devices, software applications and health tools and services that generate, collect, analyze and transmit data.

These innovations are improving clinical outcomes, advancing digital health initiatives that meet provider and patient needs, and enabling operational efficiencies. However, these tech-driven innovations are also generating large amounts of data. This means hospitals and health systems must have a powerful digital health infrastructure and reliable and scalable bandwidth to support the transmission of data across connected technologies.

Four emerging and expanding applications fueling healthcare innovation and bandwidth demand include: telehealth, artificial intelligence (AI) and predictive analytics, robotic process automation (RPA), and real-time location services (RTLS). Here's a look at what's energizing their rise in healthcare and how they are impacting bandwidth requirements.

Telehealth

Telehealth isn't new, but adoption has finally started to surge. In 2015, there were just over 1 million telehealth patients, but as of 2018, that number rose to 7 million — and is expected to continue to increase.[1]

Changes in reimbursement by the Center for Medicare and Medicaid Services (CMS) have helped spur growth by expanding reimbursement for remote care services. Providers can now receive reimbursement for staff time for interactive remote communication with patients or caregivers, for time spent in set-up and patient education when using remote monitoring equipment for physiologic data, and for the initial supply and daily recording or programmed alert transmission for remote devices.[2]

Telehealth use is also increasing because it enhances medical care and lowers costs. At one Florida children's hospital, a projected savings of approximately $113.9 million was accredited to the use of telehealth services. Without it, comparative data from the Florida ER Utilization Report indicated that 28 percent of parents would have visited the emergency department, and another 37 percent would have gone to an urgent care center. Only 6 percent of parents said they would have done nothing if telehealth options were not available.[3]

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Connected medical devices expected to double

From 2017 to 2022, the market for medical devices is expected to more than double.[5] Fueling this growth includes devices such as:

- **Stationary devices:** X-ray and mammography devices, CT and MRI scanners, ultrasound machines, and nuclear imaging devices.

- **Implanted devices:** Hip replacements, pacemakers and defibrillators, nerve stimulators, bladder stimulators, and a variety of biosensors to process different signals.

- **Wearable devices:** Insulin pumps for diabetes monitoring, skin patches other devices such as smartwatches and activity trackers that produce data over the network and are monitored by clinicians.

Telehealth also adds a layer of convenience and makes quality care more accessible, especially in rural communities where access to care can be limited. With the advent of live videoconferencing for virtual visits, patients and providers can conduct medical examinations and discuss concerns without needing to meet face-to-face. Patients can also get access to specialized care even when a specialist isn't located nearby through store-and-forward video conferencing, which enables the transmission of a recorded health history to a clinician for review and consultation.

Telehealth also speeds critical communications. For example, using video conferencing, EMTs can send information, including images or other relevant clinical data, to emergency department trauma teams. Having patient information before the patient arrives allows these teams to expedite care and enables significant savings in time and treatment costs.[4]

Remote patient monitoring, another form of telehealth, uses connected health devices to record a patient's health and medical data for review by a provider. This can improve patient health by allowing clinicians to remotely monitor a patient's health conditions, such as their insulin levels or blood pressure, so they can make more real-time medical interventions. This type of monitoring even helps prevent hospital visits, improving the cost of care in the new value-based payment system.

Similarly, clinicians are taking a more active role in guiding their patients' health with mobile health (mHealth). From sending general health education information to targeted texts that encourage specific actions such as getting a flu vaccine, to notifications about disease outbreaks, mHealth allows healthcare providers to keep their patients informed and engaged.

As telehealth continues to expand, it has the potential to improve access to medical care and provide a more affordable way to deliver care in both rural and urban settings. But video streaming and digital communications depends on Internet access and adequate bandwidth to ensure low latency and high reliability. As providers roll out telehealth initiatives, ensuring their network is ready and able to support the additional bandwidth needs required should be a primary consideration.

AI and predictive analytics

Another technology making big waves in healthcare is AI and predictive analytics. In 2018, 47 percent of healthcare providers were already using predictive analytics technology in some shape or form. Today, 93 percent of health payers and providers believe that predictive analytics is important to the future of their organization.[6]

A key reason for the growth of AI and predictive analytics is the technology has advanced significantly — in some cases, AI can complete tasks more efficiently and effectively than humans. Using AI and deep learning, body scanners have been shown to analyze CT scans up to 150 times faster than human radiologists — detecting acute neurological events in just 1.2 seconds.[7] This has significantly improved the patient experience by cutting the wait time for results and allowing patients to receive accurate, immediate answers about their health.

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More systems and software strain network capacity

Systems and software help reduce the delivery time and cost of projects by providing information security, data collection and data analytics, and device management and integration. However, these connected systems and software also require appropriate bandwidth capacity to pass information between systems and software.

From 2017 to 2022, the market for systems and software is expected to increase by 4x, from $9.8 billion in 2017 to $48.3 billion in 2022.[12] Systems and software include:

• Remote device management

• Network bandwidth management

• Data analytics

• Applications and network security solutions

AI can also be used to improve workflows to provide better care. At one New York hospital, AI has helped reduce risk and improved the discharge process. By scanning thousands of patient encounters to see where there are roadblocks, AI makes recommendations to the hospital's physicians about which tests to order. AI is also able to identify patients that will be discharged and automatically notifies physicians the day before so they can ensure the right consults and reports are ordered to smooth the discharge process.[8]

AI's capabilities are also transforming the way providers interact with patients. Predictive analytics can ferret out underlying causes that result in hospital readmissions, including social causes, such as the lack of a safe living space that can make it difficult to keep up a post-discharge care regimen. These types of social determinants of health, such as where people live, learn, work and play, can affect a wide range of health risks and outcomes, and are linked to hospital readmission rates.[9]

Assessing and scoring chronic disease risk is another area AI and predictive analytics is proving useful. Massive data produced by claims records, clinical reports and lab tests, along with patient-generated health data, allow AI algorithms to glean intelligence that can predict which patients are at risk and to spot health challenges before they fully manifest themselves.

On the administrative side, AI can improve workflows like scheduling. One health system identified nearly 5,000 patient appointment no-shows using a predictive analytics model and electronic health record (EHR) system data.[10] Through these types of predictive analytics, AI can streamline processes and workflows and reduce healthcare costs. Over the next five years, healthcare executives anticipate predictive analytics will help them save 15 percent or more.[11]

While the benefits of AI are clear, supporting any AI initiative also requires the ability to manage the large volumes of data. To do so, hospitals need reliable and resilient networking bandwidth, which has the capacity to not only support big data transmission needs but an increasing number of IoT sensors and devices. As AI initiatives increase, health systems will need to take a closer look at the level of connectivity demand these initiatives require and ensure they have the capacity to meet them.

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The growing impact of IoMT on bandwidth

Connectivity technologies enable the Internet of medical things (IoMT) ecosystem by connecting people and devices to the Internet. From 2017 to 2022, connectivity technology is expected to double.[15] Connectivity technologies include:

- Wireless technologies such as WiFi

- Bluetooth low energy (BLE)

- Near field communication (NFC)

- Zigbee for medical device collection

- Cellular and satellite technologies

Robotic process automation (RPA)

Like AI, RPA, is part of a continuum known as intelligent automation (IA). But while AI focuses on simulating human intelligence through machines, RPA focuses on simulating human actions through software robots.

RPA usually doesn't require upgrading or replacing existing systems and enables healthcare professionals to shift time-consuming, error-prone manual work from human to machine. The ability of RPA to free up healthcare professionals' time to focus on more critical activities, like interacting one-on-one with patients or innovating, may be one of its most valuable aspects given that according to HIMSS, 95 percent of IT decision-makers think finding time to innovate or disrupt is a challenge.[13]

By using RPA, which can analyze data from a number of medical knowledge databases, healthcare providers can be more effective in delivering high-quality care, improving care coordination and streamlining case management. On the back end, RPA can free up administrative processes such as claims management by automatically inputting, processing, and adjusting claims as well as handling appeals. Similarly, RPA can shorten the billing cycle by seamlessly adapting to code changes and automating time-consuming data digitization and accounts payable processes.

At one hospital, RPA is already being used to standardize the workflow and to allow bots to scan through patient bills and applicable records from the patient encounter. This has enabled the hospital to automate follow-up with payers and is expected to drive down costs for its bill pay and claims follow-up services.[14]

Like other technologies covered here, the amount of data that will be used throughout the RPA process can impact bandwidth requirements. Because RPA technology doesn't integrate with the software, but sits on the presentation layer, RPA can only work as fast as the application works. And connected applications can only work as fast as the bandwidth they have access to allows. Thus, healthcare organizations need to consider their networks' overall bandwidth capacity when implementing RPA initiatives.

## Real-time locationing services (RTLS)

The adoption of RTLS is on the rise within hospitals and health systems. RTLS is now being used to track and monitor equipment, medical devices, staff, patients and lab specimens.

One of the biggest benefits of RTLS is that it can improve patient experience. By automating activities such as inputting data into an EHR platform, computerized maintenance management software (CMMS), or electronic whiteboard, RTLS allows clinicians to make more eye contact with patients, actively listen and have more time to ask questions. Family communication is also improved as electronic whiteboards can be synced with RTLS data to keep family members informed throughout the care process.

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RTLS can also improve cleanliness, which can impact patient health, by using location data obtained from tagging equipment, patients and staff. Personnel can be notified in real time about which equipment or rooms need to be cleaned without the need for manual data entry. RTLS can also prompt clinicians to wash their hands and automatically record when they've done so to further improve cleanliness and compliance.

Another patient complaint that contributes to a poor experience is a noisy hospital environment. RTLS helps resolve this issue by supporting workflows that improve patient rest, such as by integrating with wireless devices nurses carry, which reduces the need for nurses to communicate via overhead paging or loud walkie-talkies. It can also automate call cancellation and rounding reminders so that nurses can complete rounds more efficiently to minimize disruptions when patients are sleeping or resting.

Rising adoption of RLTS: Healthcare IT decision makers are expecting rapid increases in adoption of RLTS over the next few years.[17]
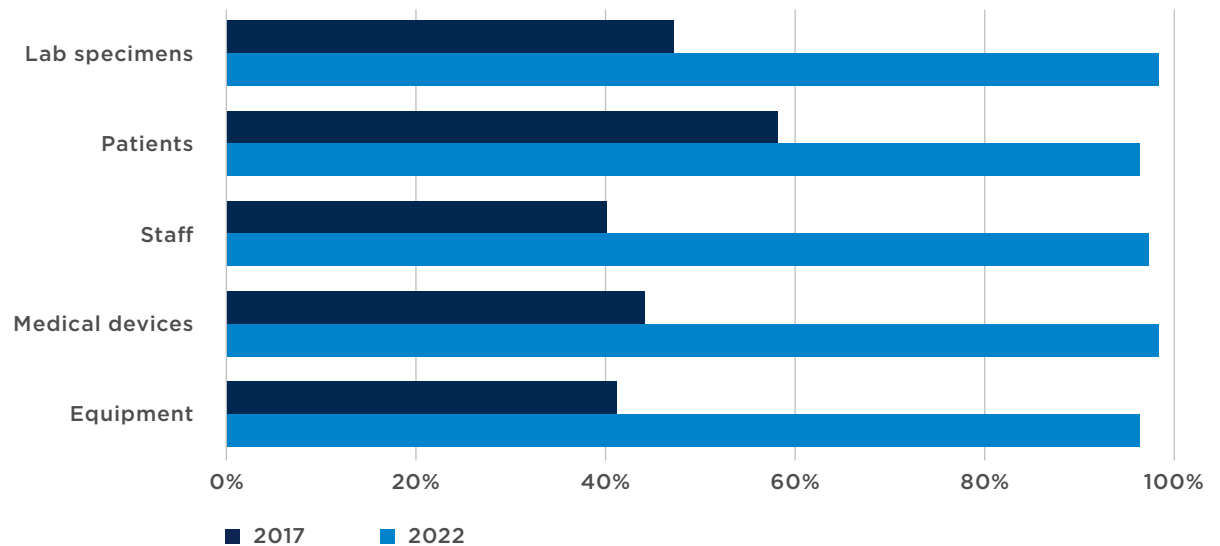
In addition to improving patient experience, RTLS can reduce costs for healthcare organizations. For one Texas health provider, implementing an RTLS system decreased the time it took to locate equipment, which helped them better maintain par levels on nursing units and reduce their expenses for new equipment. Since implementation, the healthcare provider has saved $412,000 in hard savings plus an 80 percent decrease in biomed equipment repairs. Thanks to RTLS, equipment is better managed and workflows are more streamlined.[16]

For these critical RTLS initiatives to succeed, healthcare organizations must have a stable, underlying infrastructure with enough bandwidth to manage not only the load of these services, but also all other data being carried over the network. The demands of RTLS vary depending on the type of RTLS used, so the type of RTLS and overall network demands will both need consideration.

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Do you have the right bandwidth?

The healthcare system generates approximately a zettabyte (a trillion gigabytes) of data annually, and this amount is doubling every two years.[18] Telehealth, AI, RPA and RTLS are already contributing to this massive data influx and other technologies and trends will only continue to impact bandwidth requirements:

• Cloud computing is expected to grow 20 percent by 2024[19]

• Telehealth is expected to grow 27 percent by 2023[20]

• Unified communications is expected to grow 9 percent by 2024[21]

• The global 3D medical imaging equipment market is expected to grow at a CAGR of around 6 percent during 2019-2024[22]

Given the projected expansion of digital-dependent technologies, many CIOs and CTOs are rethinking bandwidth requirements. Reliable and scalable networking is necessary to keep up with projected demand and advance digital health initiatives that will meet hospital and health system needs and improve patient care.

Learn more about how to make sure your hospital or health system is prepared for bandwidth demands at enterprise.spectrum.com/healthcare.

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