

Data Bandwidth: Critical to Healthcare Providers



Executive Summary



The healthcare industry's appetite for data is insatiable. Beyond patient records, insurance information, test results, and clinical research data, there lies another element contributing to the huge consumption of data: real-time communications.

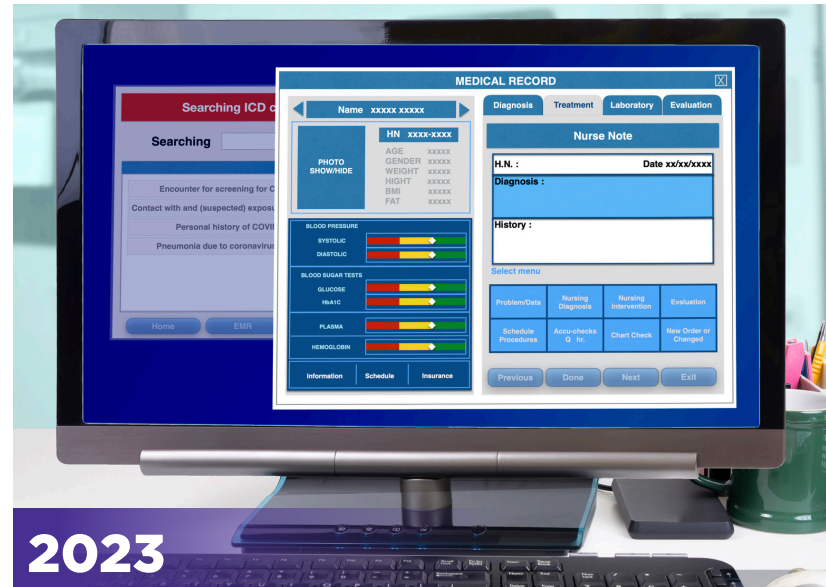
Today's medical practices and hospital networks require secure, high bandwidth connectivity to handle the wide variety of video services needed to satisfy patients and provide quality care. Active digital signage in hospital waiting rooms, concurrent telehealth visits between doctors and patients, constant file transfers of large medical images, and HD television streaming in every room in the facility – all at the same time over the same connection – are just a few of the reasons why healthcare providers need greater network bandwidth.

The trouble is that most medical practices, hospital networks, clinics, radiology centers, rehabilitation centers, assisted living facilities, and other healthcare-related businesses are running their networks on coaxial cable, not fiber. This white paper examines the reasons why healthcare providers need high bandwidth connectivity, and how today's modern IT/Telecom solutions can help drive success in the healthcare industry.



The (R)evolution of Data in the Healthcare Industry

Evolution takes time, a lot of it. Comparatively, the digitization of healthcare has revolutionized the industry almost overnight. Since the early 2000s we've gone from storing handwritten patient notes in folders to electronic health records (EHR) and totally paperless workflows.



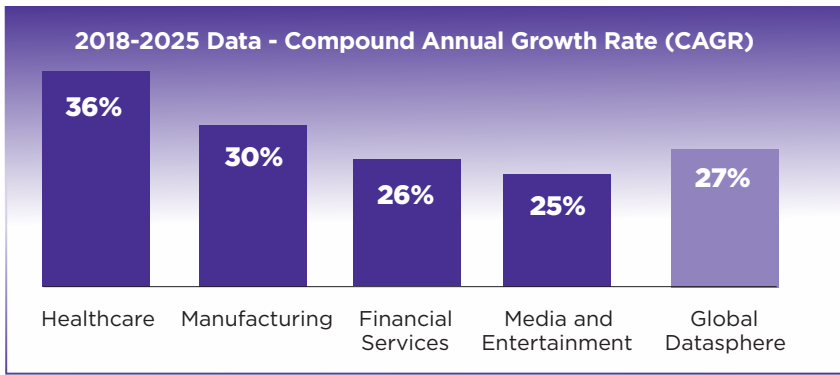
Visit your doctor's office or a hospital today and everything "gets entered into the system" – from your insurance information to your weight and blood pressure, the reason for your appointment, diagnoses, and doctor's notes. In fact, the whole process is digitized from patient referrals to sending prescriptions to your local pharmacy and submitting your insurance claim for reimbursement. However, that's just the tip of the massive iceberg that is healthcare data.

Patient records, insurance information, lab test results, and prescriptions account for a tiny fraction of the volume of data generated by the healthcare industry. Those files are just a few kilobytes (KB). Even your average MRIs, ultrasounds, X-rays, and CT scans are well under one megabyte (MB).

In recent years, advancements in medical sciences and technology have created countless innovations in healthcare from new imaging techniques to drug therapies, vaccines, biometric monitoring equipment, smart wearables, and more. Today's high resolution radiology images, like a digital mammography, can be upwards of 25 MB, and a single radiography image can be 30 MB or more.¹ Remote monitoring and wearable devices generate a constant stream of data between provider and patient.

Now multiply this by the tens of millions of people who visit doctors or hospitals each day, and it's easy to see why the healthcare industry is leading the charge in data growth.





These numbers refer to information created, captured, and stored in some type of medical records system such as patient histories, treatment plans, quantifiable lab and test results, and radiology images. Here the data is archived and organized for fast access by physicians, administrative personnel, and caregivers. And granted, there's a lot of it. But there is another element contributing to healthcare organizations' huge appetite for data not included in these numbers that specifically affects bandwidth: **real-time communications.**

Spurred by the pandemic, advances in technology have led to exponential growth in telemedicine, allowing medical professionals to consult with colleagues and treat patients remotely. It's one thing to have the digital space to store patient records and medical images; it's quite another to have the network bandwidth to accept large file transfers while supporting several doctors sharing high resolution medical images with specialists or conducting telehealth visits with patients and discussing test results, diagnoses, and treatment plans in real-time, at the same time, over the same connection.

The trouble is that most medical practices and hospitals (except new builds) are about 10 years behind on technology. Their networks tend to be running on coaxial cable, not fiber.

High bandwidth fiber optic connections and customizable solutions are essential for supporting all types of sophisticated, data-hungry healthcare providers such as:

- Large healthcare systems and regional hospital networks
- Radiology and diagnostic centers
- Multi-physician practices
- Nursing homes, memory care, and assisted living facilities
- Physical therapy and rehab centers
- Clinics and urgent care centers

These businesses and those that serve them need to communicate with their partners and patients on a more accurate and timelier basis than copper wire can provide.

What's a Terabyte?

A terabyte is one thousand gigabytes.

According to a study by Statista, the global healthcare sector generates more than 19 terabytes of clinical data alone each year.² Today, approximately 30% of the world's data volume is being generated by the healthcare industry. By 2025, the compound annual growth rate of data volume for healthcare will reach 36%, outpacing that of all other major vertical markets.³

Data and technology will continue to play a crucial role in nearly all aspects of the medical industry, from research and development to patient care and administration.





Why Does the Healthcare Industry Need a Lot of Data Bandwidth?

As healthcare becomes increasingly digitized, medical professionals require reliable and fast internet services to keep pace with demands. High bandwidth connectivity is needed for everything from AI to digital whiteboards, digital signage, and TV in patient rooms, for instance. Let's dig a little deeper into why healthcare providers need a lot of bandwidth.

- **Increased use of high-resolution medical images.** The sizes of medical images are growing exponentially, consuming huge amounts of memory. Significant amounts of bandwidth are required to quickly and efficiently accept large files transmitted from radiology centers to the practicing physician, display these images and scans to patients in the office, or share them with other professionals outside the organization for consulting, research, or insurance purposes.
- **Concurrency.** The amount of data generated by a single patient for a single visit is astonishing. With numerous patients being seen at a multi-physician practice simultaneously, or hundreds of patients being cared for in a hospital, a high bandwidth connection is required to ensure all patient admission, monitoring, testing, and communication activities run smoothly and without interruption.
- **Multiple devices and locations.** Medical staff often need to access data and images from multiple locations (private offices, patient consultation rooms, conference rooms, lecture halls, etc.) or to display them on different devices (laptops, tablets, phones, desktops, whiteboards, etc.). High bandwidth is needed to access and display these images on demand.
- **Electronic health record (EHR) systems.** A high bandwidth data connection is necessary to ensure that EHR workflows are executed efficiently, improving quality of care, and reducing the risk of errors. Multiple users are constantly inputting, updating, and accessing patient data. Cloud-based patient portal apps like MyChart continue to grow in prevalence, creating additional demand upon healthcare IT and telecom systems. A well-functioning EHR system enables speedy patient and insurance data entry, reducing billing and payment cycles.

- **Telehealth visits and remote workers.** As the general public has come to accept the concept of video conferencing using apps like Zoom and Teams to keep in touch with friends, family, and colleagues during the pandemic, telehealth visits have accelerated and become much more commonplace. Real-time, high-resolution video conferencing consumes a lot of bandwidth, and call quality can be affected (freezing, pixelation, dropped connections) with too many simultaneous users.

A related issue is access for the home-based medical worker. Traditionally, most healthcare providers required on-premise handling of patient medical records, clinical, and insurance data due to regulatory and compliance challenges. However, since the pandemic many practices have enabled administrative, clerical, and customer support personnel to work remotely for perhaps a few days per week. To perform their jobs efficiently, these people also need secure, reliable connections to the network to access EHR and billing systems.

- **Remote patient monitoring/wearables.** As technology evolves, even more data is being generated by smart devices that are worn by or surgically embedded into the patient. Examples include pacemakers, spinal pain blocking or nerve stimulation implants, and glucose monitors that allow diabetics to check their blood sugar levels without pricking a finger. When these patients come into the office for a checkup, data from those devices and apps is collected and accessed for accurate medical histories and continuing treatment.

Likewise, 24x7 closed circuit television (CCTV) is often used by nursing staff at hospitals or nursing homes to remotely monitor bedridden patients, with each stream adding more data volume.



- **Marketing, communications, and digital signage.** Healthcare is a business. Like any other business, providers need to differentiate and promote their services to satisfy customers – in this case, patients. Effective digital signage such as outdoor billboards, emergency room waiting lists or testing wait times, plus video entertainment in the lobby all serve to minimize frustration while patients and family wait for care.

Once admitted to a hospital, rehabilitation center, or assisted living facility, patients and residents require television and entertainment in every room. They will want to surf the web, stream their favorite shows on Netflix, or video chat with the grandkids. Healthcare facilities – especially long-term care providers – need high bandwidth connectivity solutions to be able to offer these services in every room to attract and retain residents.

Security in Healthcare Communications is Critical to Success

The need to ensure that all connections and communications remain secure end-to-end, and that patient information remains protected and private, is absolutely mission critical to every business in the healthcare industry.

In fact, healthcare is one of the most highly regulated industries for information privacy. Strict compliance policies, like the Health Insurance Portability and Accountability Act of 1996 (HIPAA), with steep fines for patient privacy violations, make network security and protection of EHR data critical for every healthcare provider.

This is becoming a more complex challenge with the increased use of wireless devices, networked medical equipment, and cloud-based mobile apps, greatly multiplying the opportunities for a breach. Add the constant threat of cyberattacks, such as phishing and ransomware attempts on unsuspecting employees, patients, and visitors to a healthcare facility, and there is a clear need for system-wide, end-to-end data encryption.

Healthcare organizations collect very detailed patient information including personal data such as birthdates, social security numbers, credit card and insurance information, and more, making them a prime target for external attacks and information theft. In addition, some threats are internal, coming from disgruntled employees, vendors, or contractors seeking to steal and sell patient data. Unprotected wireless devices can be hacked, and unattended workstations can be gateways into every networked system.

To minimize these threats, those in the healthcare industry need upgraded security capabilities that support data encryption, detect and prevent cyberattacks, enable private network connections, and enforce strong password policies.

However, one of the biggest challenges to adoption is mindset – many decision-makers view IT/Telecom as an expense. As in: *It's going to cost money to upgrade to fiber.* That, however, is changing.



Modern, high speed data connections boost security and are an asset to healthcare providers, serving as business enablers by attracting new patients. High bandwidth connectivity enhances the organization's reputation for patient care and excellence, and when implemented properly, provides critical redundancy of digital services to ensure business continuity in the event of an emergency or disruption to the primary connection. Dark fiber can be used to create a private network with an added layer of security to transmit sensitive information between facilities for enhanced collaboration on patient care. Secure wired and wireless Ethernet connectivity is needed to connect medical devices to the network for the fast and accurate transmission of patient data, and to remotely monitor device performance. Finally, the investment in dedicated, secure, high bandwidth connections offer built-in guiderails for compliance, reducing the organization's exposure to legal liability and financial penalties.



What Should Healthcare Organizations Look For in a Comprehensive IT/Telecom Partner?

The most important thing for all healthcare organizations, regardless of size, is to **seek out a provider that offers a fiber optic network with 24x7 support; one that is willing to work with you to meet the unique needs of your business.**

Many healthcare organizations gravitate to national service providers believing only they can support their needs. Large advertising budgets with smiling customers promoting brand recognition and national coverage helps convey the message. But bigger isn't always better. Will you get the attention you deserve ... the responsive support you need... and the affordable pricing you want from a national carrier?

Indeed, most small to mid-size healthcare businesses are best served by a right-sized carrier that has demonstrated the willingness and ability to seamlessly partner with other carriers when needed for the overall benefit of the customer. Oftentimes it is the IT/Telecom provider with a smaller footprint but an enhanced local presence that provides more flexibility in terms of products and services, and a more agile and attentive customer support experience.

Larger hospital networks providing services in multiple markets don't necessarily need to choose a national carrier. In fact, it is probably more important that the service provider has experience supporting businesses in the healthcare industry. Do they understand the intricacies of EHR systems or the need for secure high bandwidth video communications? Ask about the carrier's portfolio of customers and history in healthcare. And can they integrate with other IT/Telecom providers to seamlessly unite legacy equipment and services across carriers and geographies in those instances where some client locations may lie outside of their own footprint?



At the end of the day, you want to select an IT/Telecom partner that has the sophistication and capabilities of a large carrier, with the dedication to customer care of a local provider.

Lastly, as mentioned, most older buildings housing healthcare-related businesses are running coaxial cable behind the walls. Yet fiber is required to carry the massive amount of data needed to effectively and securely transmit today's medical workloads of high-resolution images, enable concurrent video communications for telemedicine visits, and bring HD video and streaming services to every room in a facility. Fiber provides the most reliable, secure, and scalable internet connections. **Your chosen provider should be ready, willing, and able to modernize your operations with fiber.**

Other characteristics to look for in a fiber-enabled IT/Telecom provider include:

- ✔ **The ability to meet all connectivity needs.** Manage all data, voice, and video communications through a single provider for streamlined service and support.
- ✔ **Low latency and redundancy for fast, reliable operations.** Backup and disaster recovery solutions should be part of the service package for business continuity purposes.
- ✔ **Customization capabilities** that allow current workflows or proprietary processes to remain in place, or the flexibility and know-how to create new ones with minimal disruption.
- ✔ **Encrypted communications and robust security measures** to share patient data without risk of exposure to compliance violations, securely conduct telemedicine visits, and collaborate with professionals across multiple locations and facilities.
- ✔ **Availability of dark fiber** (fiber optic cables currently not in use) to create a private network with dedicated internet access for multi-location healthcare facilities to share and manage sensitive patient information with an additional layer of security.
- ✔ **Serial-to-Ethernet connectivity solutions** to network-enable medical devices to extend the life of existing equipment such as blood analyzers, glucose monitors, EKG machines, defibrillators, and imaging machines. Connected devices eliminate human error when transcribing vital signs, and data is transferred immediately for faster diagnosis.
- ✔ **Scalability for today and tomorrow** with the resources to grow with your organization over time.

By reducing the cost of operations while improving the quality of patient care, the right IT/Telecom partnership and investment in fiber should be viewed not as an expense but an asset that drives business and attracts new patients.

Modernize Your Network with Astound

The amount of data being generated in the healthcare industry is growing exponentially with no end in sight. For some healthcare businesses, high bandwidth connectivity can literally be a matter of life and death. Secure, high bandwidth fiber connectivity from Astound Business Solutions can positively impact healthcare organizations in many ways by:

- ✓ **Enhancing** communications with patients to reduce delays and realize better outcomes.
- ✓ **Streamlining** administrative activities such as new patient registration, referrals, follow-up visits, and prescriptions, enhancing productivity and eliminating errors.
- ✓ **Expediting** billing and payment/reimbursement cycles for improved cash flow and increased profitability.
- ✓ **Insulating** healthcare institutions against security threats and leaks of confidential patient information and the resulting fines and penalties.
- ✓ **Allowing** healthcare facilities to offer a wide variety of entertainment channels and digital services to extended stay patients to increase occupancy rates.
- ✓ **Integrating** legacy medical devices into networks to reduce total cost of ownership.
- ✓ **Providing** the capacity and expertise to build private dark fiber networks.

Contact an Astound representative to learn how our coast-to-coast fiber optic network can take your healthcare organization to the next level.

Sources & Acknowledgements

¹https://www.researchgate.net/figure/File-sizes-of-images-from-different-imaging-modalities_tbl1_26831435

²<https://www.jdsupra.com/legalnews/what-is-data-volume-and-how-to-face-1804605/>

³https://www.rbccm.com/en/gib/healthcare/episode/the_healthcare_data_explosion

