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How 5G Will Support the Healthcare Industry



Background

Although not on the forefront of peoples' minds as an industry that relies on the internet and being connected to a network, the healthcare industry has been revolutionized over the years from improvements in wireless service like Wi-Fi and cellular. Medical staffs are increasingly able to easily look up stored patient data online via electronic medical records. Basic communications challenges like doctor to nurse voice communications hampered by the dense building materials blocking wireless signals have been overcome. Many machines, such as oxygen monitoring devices, rely on wireless to properly function. On top of functional uses, hospitals are areas of extremely heavy traffic and have thousands of patient and doctor devices connected daily. The industry as a whole, though, has been comparatively slow in those developments and improvements.

With new advanced connectivity come opportunities to improve access and outcomes in the field. The latest network technology looks to deliver extreme reliability, capacity and low latency to enable healthcare personnel new capabilities, patients to receive care where they are instead of at a healthcare facility and mobilized the connected machines to reach their maximum potential.

Three Ways 5G Will Change Healthcare

The next generation of mobile network technology, 5G will revolutionize the healthcare industry just as Wi-Fi did. In particular, this whitepaper will focus on three different ways 5G will improve healthcare. First, we will dive into 5G's ability to enable more robust home healthcare. Next, we will focus on why 5G is suited to address a hospital's needs for their connected technology to be highly secure to protect patients' medical history and data. Finally, we will discuss how this new generation of mobile networks can enable new, cost effective therapeutic and training tools.

Home Healthcare

There is currently a major gap between care when patients are at a hospital compared to at their home. More and more patients want to either be consulted or treated at home instead of having to deal with long wait times and high costs at hospitals. In many instances, patients are released from the hospital only to arrive back weeks, or even days, later. The readmission rate across the United States for patients enrolled in Medicare over the age of 65 is 14.9%, with some states reaching as high as 15.7%¹. As far as home healthcare has come in the last few years, there is still a ways to go until it is a truly viable second option to hospital care. 5G networks will help home healthcare inch closer to that reality.

5G will help improve the growth of home healthcare services like video chats with care givers over a secured 5G mobile network. Additionally, 5G will enable a host of wearables and other remote monitoring and rehabilitative devices that are key to making home healthcare a primary recovery and treatment option. The low latency of 5G services will allow nurses and doctors to monitor patients in real time. Additionally, any abnormalities or emergencies will be reported with no delay, and 5G networks can provide care givers instant and high quality links to assess patients, decreasing the likelihood of further injury or complications. Unlocking the additional potential of home healthcare will also enable high levels of care for the elderly, allowing them to stay in the comfort of their homes for as long as possible before moving to an assisted living or senior care center. Unleashing the host of monitoring, rehabilitative, and therapeutic services in the home is a reality with 5G, further driving better care outcomes and reducing ever rising healthcare costs.



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¹ https://www.americashealthrankings.org/explore/senior/measure/hospital_readmissions_sr/state/ALL?edition-year=2018

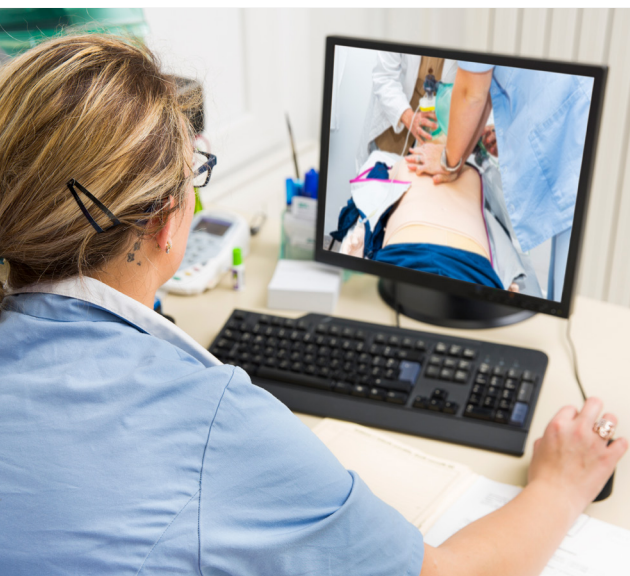


Remote Medicine and Emergency Care

Delivering timely and effective triage care is critical in emergency situations – take those cardiac arrest patients where brain damage can set in starting at four minutes. The U.S. model has traditionally been a ‘patient-to-hospital’ practice but 5G connectivity could bring the hospital to the patient in an effort to speed up treatment. Next generation network technology in the form of 5G networks could equip U.S. first responders with a new set of tools to drive faster positive emergency care outcomes.

For example, current medical application providers have developed apps that allow paramedics to alert the emergency department of their pending arrival with great accuracy using GPS information of the ambulance as well as sending in advance the ECG, personal data, images and any other trauma information that would help ER team members to be prepped to receive the patient with the proper personnel and equipment. Furthermore 5G networks could support 4K body cameras that have a live link with ER doctors or specialists to help guide an EMT through a procedure in the field or to help assess, treat and prepare for transport an injured patient. The network technology needed to support these high-definition streaming video feeds require high capacity and low latency, which only 5G can do.

In addition to the need for quick response time is the need for public safety dispatch officials to have situational awareness to provide the proper resources and equipment. Still other application access to HD traffic monitoring cameras, drones equipped with 4K video can relay information back to public safety officials to provide high definition real time information regarding the emergency situation to assess and dispatch the proper emergency response resources.



Additionally, a 5G enabled ambulance or in rural areas mobile clinics could enable AR assisted operations enhancing EMTs or a general practitioner’s capabilities through guided steps to perform critical care in the field. Remote or rural areas where medical specialists may not be accessible, a generalist now has a powerful tool in which to diagnose and treat or perform some needed procedures through the use of AI assisted Augmented Reality tools that they previously would have had to address with a referral.



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Healthcare Training, Therapeutic, and Rehabilitative uses for VR

Virtual reality is typically associated with the gaming industry, but VR has already transformed many aspects of the healthcare industry. With virtual reality, hospitals are able to immerse patients and doctors in any environment of their choosing.

Virtual Reality therapy has become an innovative way in which hospitals are using VR to benefit patients and help them recover from chronic pain or injuries. VR has been proven to reduce chronic pain by 25 percent, which not only improves the patient's wellbeing, but also saves them money by reducing the amount of time they need to spend in a hospital.

Additionally, doctors and medical students are able to use VR to simulate operations that would otherwise be limited to the staff performing the operation. Currently, though, hospitals and therapeutic centers are limited in their VR capabilities due to expense, operational support and accessibility. Today, truly effective VR based medical training modules require a wired VR kit to produce the realism needed to be an effective tool. A 'wired' VR set-up can be an expensive PC with advanced audio cards and connectivity – requiring hospital IT and security support, resulting in thousands of dollars to support.

Current top of the line VR technology is limited to being wired to a computer which is due to the low latency required that comes with high-speed broadband service. Today, inexpensive wireless VR works via compression and other technics but falls short of the intense immersive experiences due to the higher latency in network creating lag input users will experience while using a headset. With 5G, high-end VR will finally be able to go cordless and provide mobility that will make both doctors' and patients' lives easier. Mobile VR will be able to reach a wider audience of patients, including those that are not able to leave their beds or their rooms and at a fraction of the cost that wired VR set-up comes with.

Conclusion

While Wi-Fi and 4G has advanced the hospital technology and experience significantly, 5G will have a transformative impact. With latency low enough to provide up to the second, real-time information whether delivering a live HD video link to an EMT in the field with a patient or delivering images and patient data to doctors in route, 5G will allow the healthcare industry to reach new heights. With ultra-reliability and improved security, hospitals can make those advancements without risk to clinical outcomes or putting their patients' private information and data at risk.



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