

# The 5G healthcare revolution

## Remote surgery and robotics



5G technology is bringing about a change in how we think about communication technology, transcending traditional uses with its higher speeds, low latency and improved capacity. Researchers are looking at how the technology can be implemented in their respective fields, and use cases are being actively developed for the healthcare sector.

Over 50% of the world still lacks critical healthcare services and over 100 million people around the globe are pushed into poverty due to healthcare expenses.<sup>1</sup> The COVID-19 pandemic put additional pressure on healthcare systems around the world, especially those in developing countries. The early days of the pandemic led to an upsurge in the adoption of remote healthcare and telehealth. This brought down healthcare costs for both providers and patients, improved accessibility, and freed up physical healthcare facilities for those who needed critical care.

Patients, healthcare providers and regulators were earlier hesitant to adopt remote healthcare due to low accessibility, coverage and legal requirements. The pandemic helped the healthcare community overcome these hurdles. The global market for virtual or remote healthcare is expected to reach over USD 450 billion by 2030.<sup>2</sup>

## Impact of 5G on healthcare

Though wide adoption of 5G is still not a reality, select urban areas in the country are expected to utilise 5G by 2025. Medical data is growing at a CAGR of 36%.<sup>3</sup> Through the utilisation of this healthcare data, the impact of 5G has begun to extend across the healthcare value chain. The benefits of the implementation of 5G vary for the different participants – healthcare providers, payers and pharma companies.

1 <https://www.who.int/news/item/13-12-2017-world-bank-and-who-half-the-world-lacks-access-to-essential-health-services-100-million-still-pushed-into-extreme-poverty-because-of-health-expenses>

2 <https://www.statista.com/statistics/671374/global-telemedicine-market-size/>

3 <https://www.forbes.com/sites/forbestechcouncil/2021/08/06/the-skyrocketing-volume-of-healthcare-data-makes-privacy-imperative/?sh=55f2a04a6555>

## Healthcare providers

The COVID-19 pandemic exposed the challenges in our current healthcare ecosystem – especially in hospitals and other healthcare centres which were the most affected. Except for a minority of healthcare providers, healthcare equipment was not tagged electronically, and their inventory was maintained manually. As the pandemic spread, it became harder for hospitals to determine if they had the requisite equipment to handle the incoming load of patients. Most hospitals have stayed away from an inventory system because of the limited margins and questionable return on investment (RoI). 5G promises to do more than just track equipment. It could track the vitals of patients, occupancy rate of rooms, movement of providers (including doctors and nurses) and control the hospital's operations, including management of the equipment inventory in a methodical way. Telehealth has already garnered much interest and 5G will be able to unlock its full potential by combining insights from wearables. The wearable industry is growing at a CAGR of 13.8% and is expected to reach a market value of USD 118.16 billion by 2028.<sup>4</sup> This could further enhance the healthcare experience.

An innovative way in which 5G-enabled healthcare services could improve the lives of people is connected ambulances. A connected ambulance collects and conveys information about a patient in need of critical care through sensors, wearables, streaming high-definition cameras to the doctors at the hospital, so that the hospital can be prepped to handle the patient once they arrive. In highly critical situations, paramedics could also be helped by specialists to perform certain procedures or diagnoses before arriving at the hospital as the paramedics would be able to relay vital signs, transfer 360-degree images and make seamless video calls to medical providers.

## Payers

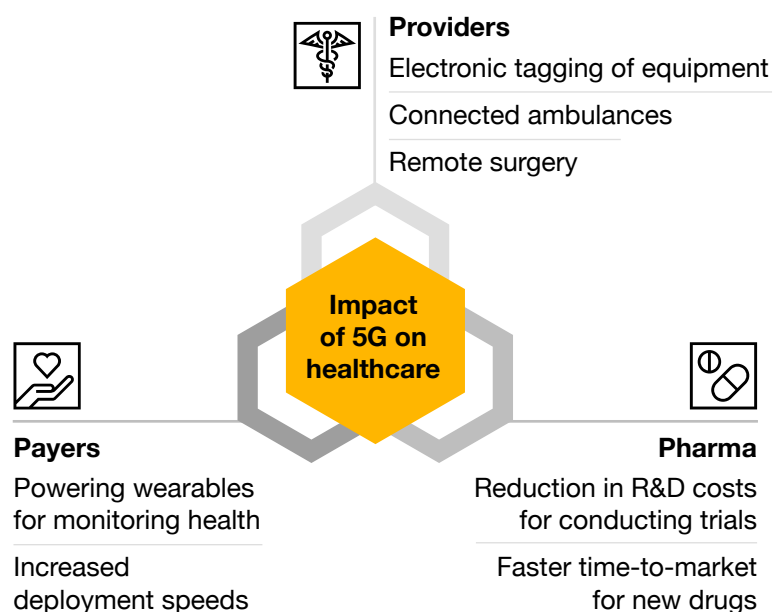
A wearable industry that is powered by connectivity through 5G will also aid healthcare payers. Payers are incentivised to make sure that their clients are healthy and receive early diagnosis of ailments to reduce costs. The wearable industry could help monitor vitals, sugar levels and heart rate, and this could be especially useful for diabetic and heart patients who are at risk, thus helping to save countless lives. As the scalability of 5G improves, more and more providers would fit their customers with these monitoring devices, which would help with better diagnosis of health conditions and to closely monitor them. Thus, providers would be able to predict any serious illnesses in a timebound manner through the IoT wearables, thereby improving the health outcomes of patients.

With increased speeds, payers could enhance the treatments that doctors currently employ. Be it a second opinion on a scan or a diagnosis, a transfer of the MRI or CT scan data is necessary, for example, to the other healthcare professional. Current communication infrastructure allows such transfers to take place at a very slow speed. 5G could help with the instantaneous transfer of large files and, thus, quicker diagnosis. 5G-assisted treatments have the potential to improve patient outcomes. Augmented reality (AR), virtual reality (VR) and artificial intelligence (AI) linked operational equipment supported by a large medical database can help in complex clinical procedures by enabling surgeons to make recommendations based on the database.

## Pharmaceutical companies

For most pharma companies, clinical R&D trials take up a huge chunk of their cost and time. A successful trial requires a constant flow of information from the trial participants. In most cases, the vitals are collected by the patients themselves, or they go to a hospital or doctor for a diagnosis. This increases the cycle time of trials and associated overhead costs, which in turn increases the overall time-to-market associated with a drug.

Through the use of multiple health sensors, 5G minimises the time, cost and effort involved in R&D trials by ensuring a seamless flow of information from the patient to the provider and then on to research labs. 5G would thus facilitate the drug discovery process and enable an ecosystem of intelligent medicines.



<sup>4</sup> <https://www.businesswire.com/news/home/20220104005806/en/Global-Wearable-Technology-Market-Trends-Analysis-Report-2021-2028-Adoption-of-Fitness-Trackers-and-Health-based-Wearables-is-Anticipated-to-Propel-Growth---ResearchAndMarkets.com>

## Remote surgery – a reality with 5G?

One of the areas in which 5G shows tremendous promise is remote surgery. The current technology has already made possible demonstrations of medical procedures and broadcasting of medical surgeries in real time. 5G can take these developments to the next step by means of the ‘tactile internet’. With ultra-low latency powered by 5G, a healthcare worker could operate on a patient located on a different continent. This would be accomplished through computerised equipment that mimics the healthcare provider’s movements instantaneously. This technology would especially be useful for people in remote areas with limited access to healthcare specialists in specific domains or who need to undergo complex surgical procedures.

The global AR/VR market related to healthcare is estimated to grow at a pace of 28.3% and reach a valuation of USD 7.06 billion by 2026.<sup>5</sup> Much of this growth will come from the pivotal role of AR and VR in the larger implementation of real-time remote surgery. With its improved speeds and ultra-low latency, 5G will be an enabler for these AR and VR technologies.

A Chinese tech giant in partnership with a medical university based in China has implemented the world’s first animal experiment surgery aided by 5G technology.<sup>6</sup> The doctors were able to perform a successful remote hepatic lobectomy on an animal from a distance of about 50 km.

A hospital in China used a 5G-enabled robot to perform telerobotic remote spinal surgery to treat patients suffering from spinal disorders. The robot successfully implanted over 62 pedicle screws in the patients’ spinal cord.

Similarly, a UK-based telecom major, in collaboration with an Italian technical institution and hospital, set up a platform to perform remote surgery to treat diseases affecting the vocal cords on a model of the larynx.<sup>7</sup>

Through VR headsets, doctors were able to livestream the operation as it was being performed. AR was also used to provide an inlay visual of the patient’s scan results, enabling the doctors to get a better idea of the individual’s blood vessels and capillaries.

Widespread implementation and adoption of remote surgery still faces several challenges. However, apart from its use in performing remote surgery, the real-time transmission of information can also be used to consult with specialists during a surgical procedure. A 5G-enabled AR/VR headset would allow a specialist to watch a surgery from a remote location and advise the in-person surgeon.

## The future of healthcare with 5G

The combination of 5G and other emerging technologies offers huge potential to all players in the healthcare industry as a whole. Healthcare companies and technology providers will need to test the use cases and gains in efficiency from 5G.

## How can we help you?

PwC has a robust structure to help you understand the impact of technology on various business areas through our Technology Tinkering Lab. Find out more about how we leverage our in-depth industry experience to help you understand 5G and chalk out your organisation’s 5G roadmap [here](#).

5 <https://www.globenewswire.com/news-release/2019/05/15/1825476/0/en/AR-VR-in-Healthcare-Market-To-Reach-USD-7-05-Billion-By-2026-Reports-And-Data.html>

6 <https://www.livemint.com/technology/tech-news/china-conducts-world-s-1st-remote-surgery-on-a-human-using-5g-technology-1552996890995.html>

7 <https://uk5g.org/discover/5g-industry/health-social-care/5g-in-medical-treatment-UK/5g-remote-robotic-surgery-UK/>

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