

## **THE IMPACT OF 5G TECHNOLOGY ON THE DEVELOPMENT OF TELEMEDICINE AND IMPROVEMENT OF THE QUALITY OF MEDICAL SERVICES**

5G technologies promise to revolutionize telecommunications and have a profound impact on the development of telemedicine. These networks will offer significantly higher data transfer speed with minimal latency, allowing medical institutions to provide remote consultations and treat patients in real time [1]. Implementing 5G could address several issues modern healthcare faces, including improving the availability and quality of medical care, particularly in remote and rural areas where access to healthcare is limited by distance and a lack of specialists [1].

However, 5G technology is not spared of challenges and risks, such as concerns over data security, infrastructure limitations, and the possible digital divide. With the development of 5G, new possibilities for interaction between doctors and patients will emerge. Enhanced bandwidth and reduced latency will enable better transmission of medical data, such as high-resolution images (e.g., MRI or X-ray scans), video consultations, and even remote surgeries. This is especially crucial for telemedicine, where the transmission of large volumes of data in real-time is one of the primary obstacles. For instance, using robotic technologies, 5G networks will facilitate remote surgical procedures. Thanks to minimal delays, surgeons can operate on patients from vast distances, making medical care accessible to people in even the world's most remote areas [1].

Additionally, the advanced capabilities of the Internet of Things (IoT) in healthcare, which can be significantly enhanced by 5G, will allow medical devices to be connected to networks for real-time patient monitoring [1]. This may become the foundation for innovative solutions, such as wearable devices that transmit health data to hospitals or clinics for immediate response. For example, continuous glucose monitoring for diabetic patients or heart rate tracking via 5G-enabled devices could significantly improve diagnostic accuracy and treatment outcomes.

However, introducing 5G into healthcare is not without its issues. First and foremost is medical data security, which often contains sensitive patient information. Given that the volume of medical data is expected to continue growing, it is predicted that 2025 the global data volume will reach 200 zettabytes [2]. Processing and storing such vast amounts of data requires robust data protection mechanisms to prevent personal information leaks.

As a result, digital inequality may widen if 5G implementation is concentrated in more developed areas, creating a social divide in access to quality healthcare and potentially disadvantaging those in less favorable conditions. Another critical consideration is the potential impact of new technologies on human health. While 5G networks are expected to enhance patients' quality of life and healthcare outcomes, further research is needed to assess the possible long-term effects of new-generation radio waves on the human body [1]. There is no conclusive evidence to confirm or refute the potential adverse effects of 5G, but continued investigation into this issue is essential. The future of telemedicine powered by 5G appears promising. The number of connected devices within the healthcare Internet of Things is forecast to grow exponentially by 2025.

5G networks will enable rapid data exchange between doctors and patients and enhance the quality of diagnostics and treatment through the integration of technologies such as artificial intelligence (AI) and machine learning. This will also pave the way for a more personalized approach to healthcare, allowing doctors to analyze large datasets and make decisions based on more accurate forecasts. Furthermore, robotic technologies and AI development will improve the quality of remote surgeries and procedures. Some hospitals are already deploying robotic systems for operations using 5G networks, and we can expect a significant increase in such solutions in the future. This is particularly crucial for improving healthcare quality in regions facing a shortage of qualified personnel, especially in remote areas [1]. In conclusion, despite the challenges, implementing 5G technologies in healthcare has tremendous potential to improve both the availability and quality of medical services. For these benefits to materialize, overcoming the current technical, financial, and social barriers will be necessary. However, with ongoing technological advancements and improvements to infrastructure, we can anticipate significant progress in telemedicine and healthcare in general.

### **References**

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