

# Problems of China's Legal Supervision System on the Internet Medical Care Under the Background of 5G Medical Application

Yunfeng Qu , Ruiyang Liu

School of Law, Hainan University, Haikou, People's Republic of China

Correspondence: Ruiyang Liu, School of Law, Hainan University, No. 58 Renmin Road, Meilan District, Haikou, 570228, People's Republic of China, Email lawliuruiyang@163.com

**Abstract:** With the advent of 5G network technology and the maturity of medical applications associated with 5G, the Internet medical service industry is gradually developing. Given the COVID-19 pandemic crisis occasionally happened in China, hospitals were taken up most of the medical resources, the Internet medical care is seen as the alternative way for patients to access medical care and treatment. With the aid of 5G, patients nowadays can seek remote medical care, diagnosis, and surgery. However, this is not without any problems. The current legal supervision system in the Internet medical service industry is still incomplete, and ought to be augmented. This essay serves to identify and evaluate the loopholes existing in the legal supervision system in the Internet medical service industry, in the hope to improve the current system and ensure the safety of patients who are seeking Internet medical services.

**Keywords:** internet medical care, legal supervision, 5G technology, remote surgery

## Introduction

Internet medical care is a new application of the Internet in the medical service industry. It includes health education, medical information inquiry, electronic health files, disease risk assessment, online disease consultation, electronic prescription, remote consultation, and remote treatment and rehabilitation, which are carried out by the internet and technical means.<sup>1</sup>

According to the annual summary of China's Internet medical service in 2022 released by the independent investigation organization "Yi Guan Bo Yue",<sup>2</sup> as of June 2022, the number of Internet hospitals in China had exceeded 1700, and in comparison, there were only 100 Internet hospitals in December 2018. The appointment rate of tertiary hospitals (hospitals with the highest qualification) has exceeded 52.38%, the number of tertiary hospitals with online payment has reached 2337, and the number of secondary hospitals (hospitals with the second highest qualification) providing online payment, intelligent medical guidance and triage services has reached the total number of 5149.<sup>3</sup> Since the outbreak of COVID-19 in China, Internet hospitals have played an important role. Since February 2022, COVID-19 has occurred in many places in China, such as Shanghai city and Jilin province, and a large number of people have been infected. In coping with the pandemic disease, hospitals had taken up a lot of medical resources. To effectively relieve the shortage of medical resources in hospitals and ensure the medical treatment of other patients, China has successfully diverted patients to seek medical treatment through Internet diagnosis and treatment, and effectively alleviate the shortage of medical resources in hospitals. Since 1 March 2022, there were 1.16 million patients receiving Internet diagnosis and treatment in Shanghai city.<sup>4</sup>

The 5th Generation Mobile Communication Technology (also known as 5G) is the latest generation of broadband mobile communication technology and has the characteristics of high speed, low delay, high capacity, extensive connection, and easy integration of industrial networks. 5G technology has also been applied to Internet medical and health services.<sup>5</sup> Therefore, 5G medical service is seen as the expansion and upgradation of Internet medical service. With the wide use of the 5G network in China, 5G technology not only improves the efficiency of traditional online

medical consultation and internet medical services but is also applied to remote clinical surgery enabling patients in remote areas can receive better medical services. Thanks to the 5G network technology that provides a stable network with extremely low delay, the surgeon can perform remote surgical operations through 5G technology by transmitting an operation signal to control the robot that conducts the surgery for the patient.

Under the background that China's 5G technology has begun to be applied in the medical field, the conflict between the rapid development of science and technology and the lagging legislation has gradually become a major concern of the medical industry. Therefore, this essay serves to identify and evaluate the problems of supervision of the Internet medical service in China's current legal system, for its future improvement, and to share the Chinese experience of 5G medical service with the international community.

## Key Findings and Discussions

### Application of 5G Technology in the Internet Medical Service

#### Advantages of 5G Medical Service

Overall, 5G technology used in medical service and clinical medicine has the following advantages: First, it can break the space-time barrier, enable patients to assess medical resources via the Internet, and effectively relieve the resource tension of the hospitals. Second, it can effectively reduce the medical costs of patients, especially for those who lived in areas where medical resources are scarce or medical technology is underdeveloped. Patients who lived in remote and underdeveloped areas no longer need to spend huge transportation costs to go to other places that have high-quality medical services for medical treatment. In such a way, it also reduces the imbalance in the distribution of medical resources in regions with various levels of development.<sup>6</sup> Third, it can improve the intelligent management of information to enhance the personal health management of patients after rehabilitation, such as follow-up reminders after rehabilitation.<sup>7</sup>

#### Successful Clinical Surgery Cases with 5G Technology

China pays great attention to the application and promotion of 5G technology in the medical field, and constantly facilitates the development of Internet medical services. In February 2019, the world's first remote surgical operation using 5G technology for an animal experiment was successfully conducted in China.<sup>8</sup> In the past four years, the 5G technology has begun to be applied to remote surgical operations and achieved a large number of successful cases. This essay collects the most representative remote surgical operation cases with 5G technology since 30 July 2022.

On 1 April 2019, Dr. Wang Wenlin's team from Guangdong Second People's Hospital completed an operation on thoracic deformity with 5G technology.<sup>9</sup> On 10 July 2019, Dr. Chen Youxin's team from Beijing Xiehe Hospital operated fundus laser surgery via Internet medical devices.<sup>10</sup> On 3 March 2021, Dr. Wu Xinbao's team from Beijing Jishuitan Hospital made a breakthrough in the operation of closed reduction and lag screw internal fixation of bone online.<sup>11</sup> On 11 April 2021, Dr. Ling Zhipei's team from Hainan Hospital of PLA General Hospital successfully completed brain pacemaker implantation for Parkinson's disease with 5G technology.<sup>12</sup> On 25 October 2021, Dr. Li Jiaping's team from Guangdong Zhongshan First Hospital (Guangdong Second People's Hospital) performed an online femoral artery puncture surgery.<sup>13</sup> On 7 March 2022, Dr. Chen Wenzhi's team from the National Key Laboratory of Ultrasound Medicine and Chongqing Haifu Hospital completed a remote-focused ultrasound ablation operation.<sup>14</sup> On 18 March 2022, Dr. Chao Min's team from Fudan Pediatric Hospital Anhui Hospital (Anhui Children's Hospital) made an intelligent endoscopic treatment of hydronephrosis (minimally invasive urological surgery for children) powered by the 5G technology.<sup>15</sup> On 9 June 2022, Dr. Song Ninghong's team from Jiangsu People's Hospital conducted the lower laparoscopic surgery via the Internet.<sup>16</sup>

As shown from the aforementioned cases, the application of 5G technology in clinical surgery covers the fields of etiology, orthopedics, brain, and gastrointestinal. In the recent two years, the application of the 5G technology in the medical service field has gradually developed from surgery to internal medicine, and the degree of difficulty for remote surgery with 5G is increasing. The application of 5G technology in clinical surgery is developing rapidly.

## Legislation for the Supervision of the Internet Medical Service in China

With the vigorous development of the Internet medical service business, since 2018, the Chinese government has felt the urge to standardize the Internet medical service industry from the policy level and has begun to establish a supervision system for the regulation of the Internet medical service. There are mainly three parts to such supervision.

First, it has built an online supervision platform for the entire process of Internet medical treatment. Second, it supervises the qualifications of Internet medical practitioners and the authenticity of electronic prescriptions. Third, it enhances the security of Internet medical treatment, such as the security of the data which is to protect the privacy of the Internet medical platform users.<sup>17</sup>

As the supporting regulatory legal system, China has formulated a large number of legal norms to regulate the medical industry through legislation. For instance, China has legislated the Law on Practicing Medical Practitioners concerning access to medical qualifications. Concerning the determination of liability for medical malpractice, China has formulated the Regulations on Handling Medical Malpractice and Regulations on the Administration of Medical Institutions. Based on the aforementioned legislation regulating the medical industry, China has formulated specific laws and regulations that stipulate the standards and norms for the Internet medical service industry. As of 7 November 2022, the current laws and regulations related to Internet medical services were listed in [Table 1](#).

The newly added laws and regulations cover the qualification access to Internet medical services, the standardization of business development, medical information security, measures to address cyber security issues, and the legal supervision system for the Internet medical service industry has been formed. However, with the application of 5G technology applied to Internet medical treatment, it is clear that the current legal norms are not sufficient to solve many problems in the medical service industry.

## Problems with China's Legal Supervision of the Internet Medical Service Scattered Power of Legal Supervision

Various governmental authorities share the power of legal supervision on the Internet medical service industry, and the scope of such supervision includes the subject of medical service, the content of medical service, access to physician qualification, medical dispute resolution, and the privacy protection of patients.<sup>18</sup> The Measures for the

**Table 1** Current Laws and Regulations Related to Internet Medical Services in China

Entry-Into-Force Time	Laws and Regulations	Legislative Bodies
17 July 2018	Administrative Measures for Internet Diagnosis and Treatment (Trial)	National Health Commission, National Administration of Traditional Chinese Medicine
17 July 2018	Administrative Measures for Internet Hospitals (Trial)	National Health Commission, National Administration of Traditional Chinese Medicine
17 July 2018	Management Specifications for Telemedicine Services (Trial)	National Health Commission, National Administration of Traditional Chinese Medicine
1 September 2021	Data Security Law of the People's Republic of China	Standing Committee of National People's Congress
8 February 2022	Rules for Supervision of Internet Diagnosis and Treatment (Trail)	National Health Commission, National Administration of Traditional Chinese Medicine
1 December 2021	Personal Information Protection Law of the People's Republic of China	Standing Committee of National People's Congress
8 February 2022	Rules for Supervision of Internet Diagnosis and Treatment (Trial)	The General Office of National Health Commission, National Administration of Traditional Chinese Medicine
8 August 2022	Administrative Measures for the Network Security of Medical and Health Institutions	National Health Commission

Administration of Internet Diagnosis and Treatment (for trial implementation) and the Measures for the Administration of Internet Hospitals (for trial implementation) both stipulate that the main body of the Internet medical service supervision is the health administrative department, which is divided into the central and local levels. At the central level, the National Health Commission supervises Internet hospitals and their nationwide medical service. At the local government level, according to the principle of localization management, the health administrative departments at or above the county level are specifically responsible for supervising Internet hospitals and their medical services within their jurisdiction. Under the current regulatory and supervision system, two major problems will arise.

The first problem is that the functions of the regulatory and supervising bodies are inadequate. Compared to the traditional medical service industry, the Internet medical service industry involves a broader scope of supervision, such as the information security of patient privacy. The responsibility for monitoring information security belongs to the public security department, not the health administrative department. The responsibility for protecting the patient's privacy information rests on the health department. The two departments are completely independent and not subordinate to each other. Therefore, simply designating the health administrative department as the sole regulatory and supervising body cannot effectively regulate and protect the privacy of patients. It is worth noting that Administrative Measures for the Network Security of Medical and Health Institutions was formulated by National Health Commission on 8 August 2022, however, the responsibility for the cyber security issues of the internet medical service activities rests on the health department alone could not effectively safeguard the online medical activities from cyber-attacks or other related threats. The public security department with the Internet Police section has a greater role to play in shielding the medical service industry on the Internet from potential cyber security threats.

The second problem is the regulatory loopholes for doctors practicing across different regions. According to the Law on Practicing Doctors, China allows doctors to practice in different regions. However, in the traditional medical service industry, practicing doctors need to sign contracts with the local hospitals, and most medical service businesses are in hospitals where they are practicing. Practicing doctors and local hospitals have high adhesion, and doctors practicing across different regions rarely occur. In the Internet medical service, the traditional spatial boundaries have been broken. The registered places of practicing doctors and Internet hospitals may belong to different regions, and practicing doctors and their medical business activities belong to different regions. Take the aforementioned case, for example, Dr. Chen Youxin uses 5G technology to perform fundus laser surgery remotely, Dr. Chen is located in Beijing city, and his patient is located in Tumushuke city of Xinjiang Province. Beijing city and Tumushuke city are 3700 kilometers apart, and their administrative regions are not subordinate to each other. Therefore, the practicing registration place of the chief surgeon and the place where the patient receives medical service belong to two administrative regions. The principle of territoriality refers to the legal supervision and regulatory responsibility that rests on the administrative body where the practicing doctor is located. If the principle of territoriality is followed, it is impossible to determine which health administrative department is responsible for the supervision.

## Lack of Detailed Rules for Determining the Liability of Internet Medical Accidents

Currently, in response to the problem of medical accidents, China has formulated the Regulation on the Handling of Medical Accidents and the Tort section of the Civil Code, which serve to regulate the medical service activities in medical institutions. However, the aforementioned legislation cannot be fully applied to Internet medical service activities. It is especially true for 5G remote surgery, and the relevant regulations on the specific requirements of 5G surgical operation and the technical standards of 5G medical equipment are still absent. However, these specific rules and standards are closely related to the determination of medical accidents. For instance, a 5G operating room has extremely high requirements for the efficiency of network transmission and power supply stability.<sup>19</sup> At present, the method of building 5G operating rooms in some hospitals in China is to upgrade the 5G technology to the traditional operating rooms. But there is lacking specific standards and requirements for building the 5G operating rooms. Hence, it is doubtful whether the reconstructed 5G operating room can meet the standard of safe clinical operation.

Moreover, when it comes to the use of Internet medical devices for medical activities, these devices might have inherent vulnerabilities. To ensure the safety of Internet medical treatment and operations, nationalized standards for

product quality and functionality need to be formed through legislation. Once the damage is caused to the patient during the 5G operation, it will seriously affect the determination of the liability for damages caused by medical accidents. The medical accident might be caused by the efficiency of network transmission and stability of the power supply, caused by the surgeon who operates the surgery or caused by the problems of the medical devices used, which might lead to difficulty in the attribution of the responsibility for such accidents.

## Lack of Rules for Determining the Ownership of Medical Data on Cloud Storage

The ownership of medical data on cloud storage has not been clearly defined by the current legislation, which will seriously restrict the development of the Internet medical service industry. The General Provisions of China's *Civil Code* defines data as a civil right in the Chapter of Civil Rights and establishes the legal principle for protecting data. However, the current law only affirms the property rights of data in principle and has not provided any further rules to determine the ownership of data.

In practice, Internet companies generally obtain user authorization of using their personal data and information through user service agreements. These companies collect and use the personal data of clients based on the rule of "informed" and "consent". However, there is a trend for some Internet companies to obtain ownership of the personal data of clients through such agreements.<sup>20</sup> This phenomenon happens in all sectors of the Internet service industries, which could be seen as an infringement on the privacy and information security of clients.<sup>21</sup>

Medical data of patients have strong personal attributes and privacy, the security and ownership of such data should be properly protected by the legislation. From the jurisprudence of the provisions of Personal Rights in China's *Civil Code*, patients have an absolute and controllable right to their own medical data, which should not become the private property of Internet medical service providers. Therefore, China needs to form legislation with specific rules on the ownership of medical data on cloud storage, protect the personal rights of patients receiving medical services on the Internet and curb the trend of obtaining the ownership of medical data of clients via the Internet medical service industries.

## Conclusion

The development of the Internet medical service industry with the technological advancement of the 5G network has served as an alternative way for patients to access medical care and treatment and the quality of life of patients has been greatly improved. It is especially true during the occasionally occurring COVID-19 pandemic period, given that hospitals were taking up most of the medical resources in dealing with the pandemic crisis. In the past four years, China has witnessed many successful cases of remotely controlled surgical operations with the 5G network, and patients living in remote areas nowadays do not need to travel far to places with a higher quality of medical service for treatment and surgery.

The maturity of the Internet medical service and 5G technology is seen as a blessing to patients who are looking for better medical service and treatment. However, the legal supervision and regulatory norms for the Internet medical service industry ought to be in place. Although China has attempted to regulate and supervise the industry through the aforementioned legislation, there is still some room for improvement and many problems remain unresolved.

The supervision power is currently scattered over different governmental authorities, which are not subordinated to each other. Thus, the current legal supervision system needs to be improved by setting up a central authority that coordinates the various departments for supervision and regulation. The 5G remote surgery and its associated applications are lacking specific standards and requirements imposed by the government, this will leave the potential problem for determining the liability of medical accidents and make suffered patients who are looking for the assumption of liability extremely difficult. Therefore, national standards and specific requirements with details are urgently needed, to ensure the safety of patients who are receiving medical services and treatment via the Internet. Moreover, the ownership of medical data on cloud storage issue has not been addressed by the current legal and regulatory norms, which ought to be regulated by specific rules, so as to ensure the sustainable development of the Internet medical service industry.

## Funding

This work was supported by the Major Project of China's National Social Science Foundation [Grant No. 18AFX026].

## Disclosure

The authors report no conflicts of interest for this work.

## References

- Zhang X, Qing Q, Dazhou P, Kailong T. Understanding and analysis of "Internet+Medical". *Chin Health Industry*. 2016;10:67–69. doi:10.16659/j.cnki.1672-5654.2017.10.067
- China's internet medical industry summary 2022; 2022. Available from: <https://boyue.analysys.cn/sail/view/portal/index.html#/detail/20020606>. Accessed August 16, 2022.
- Efforts need to be made to improve medical services in the new development stage. Available from: <https://baijiahao.baidu.com/s?id=1687196915080593327&wfr=spider&for=pc>. Accessed November 7, 2022.
- Since March 1, Internet hospitals in Shanghai have carried out Internet diagnosis and treatment for about 1.16 million people. Available from: <https://www.163.com/dy/article/H7ILE6410514R9NP.html>. Accessed November 7, 2022.
- Gang Z, Nengcai W, Zhe W, Baoyi F, Tong C. Application of mobile communication technology based on 5G in Internet medical care. *Chin Med Equip*. 2020;(10):8–11. doi:10.3969/J.ISSN.1672-8270.2020.10.003
- Lixia H, Ruimin M, Qi S, Wei M, Yongsheng C. Design and practice of digital operating room based on 5G. *Information Computer*. 2022;2:99–101.
- What 5G medical care brings about?; 2019. Available from: <http://www.mbaxue.com/a/1528.html>. Accessed August 16, 2022.
- World's first remote operation using 5G surgery; 2019. Available from: <https://www.huawei.com/en/technology-insights/industry-insights/outlook/mobile-broadband/wireless-for-sustainability/cases/worlds-first-remote-operation-using-5g-surgery>. Accessed August 16, 2022.
- Guangdong doctor first using 5G for remote surgery; 2019. Available from: <https://mp.weixin.qq.com/s/SM9etbaMZu3Xu5mr9XLv-g>. Accessed August 16, 2022.
- Doctor and patient are 3700 kilometers apart, how 5G laser operation is distantly operated?; 2021 Available from: <http://finance.sina.com.cn/jjxw/2021-10-22/doc-iktzqtyu2868900.shtml>. Accessed August 16, 2022.
- Beijing Jishuitan Hospital successfully conducted China's first 5G Orthopedic robot-assisted trauma surgery remotely; 2021. Available from: <https://www.jst-hosp.com.cn/Html/News/Articles/19526.html>. Accessed August 16, 2022.
- Success! 301 Hospital accomplished the first 5G remote Parkinson surgery; 2021. Available from: <https://baijiahao.baidu.com/s?id=1696876345501642657&wfr=spider&for=pc>. Accessed August 16, 2022.
- A life-saving remote surgery with 5G technology; 2021. Available from: <https://baijiahao.baidu.com/s?id=1716006697393063045&wfr=spider&for=pc>. Accessed August 16, 2022.
- Remote focused ultrasound ablation surgery with 5G technology; 2019. Available from: [https://www.xinhuanet.com/science/2022-03/09/c\\_1310506651.htm](https://www.xinhuanet.com/science/2022-03/09/c_1310506651.htm). Accessed August 16, 2022.
- The first in China: Anhui Children's Hospital using intelligent lineless endoscope on surgery; 2022. Available from: <https://baijiahao.baidu.com/s?id=1727787856298919308&wfr=spider&for=pc>. Accessed August 16, 2022.
- Jiangsu medical assisted Xinjiang to complete the first 5G ultraremote robot-assisted laparoscopic laparoscopic surgery. Available from: <https://baijiahao.baidu.com/s?id=1735484572032221785&wfr=spider&for=pc>. Accessed November 7, 2022.
- Weidong W, Yutong W, Chen L. Internet medical responsibility and risk prevention; 2020. Available from: [https://www.sohu.com/a/426068207\\_120051855](https://www.sohu.com/a/426068207_120051855). Accessed August 16, 2022.
- Han W, Min C. Research and countermeasures of internet medical supervision mechanism in China. *China's Health Quality Manag*. 2021;(12):29–32. doi:10.13912/j.cnki.chqm.2021.12.09
- Zhongliang M, Feng L, Li H, Jiayi G, Weidong M. Preliminary study on 5G network construction in operating room. *PLAHosp Manag Magazine*. 2020;(11):1019–1021. doi:10.16770/J.cnki.1008-9985.2020.11.006
- bo H. Issues faced by the determination of data ownership and solutions. *Big Data Research*. 2021;(4):1–13. doi:10.11959/issn/2096-71.2021034
- Zeng W, Lei W. *Data Market Governance: Theories and Policies for Building a Basic System*. Beijing: Social Science Academic Press; 2021.

### Risk Management and Healthcare Policy

Dovepress

### Publish your work in this journal

Risk Management and Healthcare Policy is an international, peer-reviewed, open access journal focusing on all aspects of public health, policy, and preventative measures to promote good health and improve morbidity and mortality in the population. The journal welcomes submitted papers covering original research, basic science, clinical & epidemiological studies, reviews and evaluations, guidelines, expert opinion and commentary, case reports and extended reports. The manuscript management system is completely online and includes a very quick and fair peer-review system, which is all easy to use. Visit <http://www.dovepress.com/testimonials.php> to read real quotes from published authors.

Submit your manuscript here: <https://www.dovepress.com/risk-management-and-healthcare-policy-journal>