Research on Internet Hospital in China

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Abstract

If humans lose the sun, they will find it in eight minutes. If the implementation of Internet hospitals is fully improved and matched with the government's "medical community and Medical Association", the whole country will only be able to solve the problem in minutes. There are many problems in domestic hospitals, such as the shortage of medical resources in poor areas, "difficult and expensive to see a doctor, especially tired of queuing up; more disputes, more drugs, more cross infection''. Since the outbreak of COVID-19 in 2020, a number of Internet based hospitals have emerged in the wake of the policies of our government and various sectors of the society. Shanghai internet management measures define "Internet hospital" as "including the Internet hospital as the second name of the entity medical institution, and the Internet hospital independently set up relying on the entity medical institution" [1]. In short, the Internet hospital is based on the entity medical institutions, and the third party organizations provide technical support, combined with advanced technology such as AI technology, 5G transmission, three-dimensional imaging, etc., to achieve the new "Internet plus medical health" development direction of online consultation, intelligent search and consultation, remote diagnosis and treatment, chronic disease management, grading

system diagnosis and treatment, and drug delivery to home. Although the emergence of the epidemic has made the internet medical service in China develop rapidly from an uneven road to Kangzhuang Avenue, the number of registered real users has reached and exceeded the total number of the past four years just a few months before the outbreak. However, there are still some problems in Internet medicine, which is still an emerging industry. These problems include the quality and safety of internet medical services, the lag of laws and regulations, the weak willingness of cooperation among top three, the problem of multi-point practice policy formulation of doctors, the problem of Internet data storage, the problem of not carrying out Internet treatment activities for newly diagnosed patients, and how to promote Internet hospitals to achieve "medicine insurance" in an all-round way. In view of these common problems in China Internet medical industry, this paper puts forward the following solutions: from the perspective of market demand as the main driving force for the development of the industry, matching with the national "medical community, medical Consortium" policy, constantly improving laws and regulations, introducing blockchain information technology, and striving to create a platform that can promote the development of medical institutions, doctors and Internet public health the development environment of the Department and other parties, combined with the big data in the field of Internet medicine and the progress of 5g science and information technology, has formed a complete and standardized comprehensive medical service closed-loop and regional collaborative integration development, so as to achieve the real "digital health".[2] This paper uses the survey method and interdisciplinary research method, the research stage is mainly divided into early and late. In the early stage, through collecting the information about the reality and historical situation of the research object, we find out the problems existing in the Internet hospital, and then make a comprehensive comparison, analysis and induction according to the data. In the later stage, we use the scientific research methods, and use the relevant disciplines including computer, Internet, medical, legal, commercial, financial and so on to carry out cross research, They are highly differentiated and integrated into a unified whole.Finally, to imagine the solution to the problem is the core of this paper.

Keywords: Internet Hospital, medical community, Medical Association, blockchain

1、 Background of Internet hospital

In July 2015 and September, the State Council issued two official policy documents on the two links closely with the reform of the medical and health system reform, namely, the guiding opinions on actively promoting the "Internet plus" action and the guiding opinions on the construction of a hierarchical diagnosis and treatment system. Social medical and health units are encouraged to actively explore the integration and application of online medical and health information services such as Internet extended medical orders and electronic prescriptions. Its initial core goal is to effectively solve the problems of grading symptomatic diagnosis and treatment and the increasing lack of medical technology resources in poor areas. Since the outbreak of COVID-19 last year, with the strong support from the relevant preferential policies of local governments in China, many Internet hospitals have been born in China. How will AI technology, 5g transmission and medical big data solve the problems of Internet hospitals. The Internet plus hospital will integrate with traditional medical consortium and medical community, and solve many problems such as grading and treatment from the aspects of prevention, control, efficiency, time, technology, region and cost, and the shortage of medical technology resources in poor areas.[3]

2、 Prospect of future Internet hospital

1. Enterprise led Internet hospital construction initiator type1. Enterprise led Internet hospital construction initiator type

Types of Enterprises Leading the Construction of Internet Hospitals
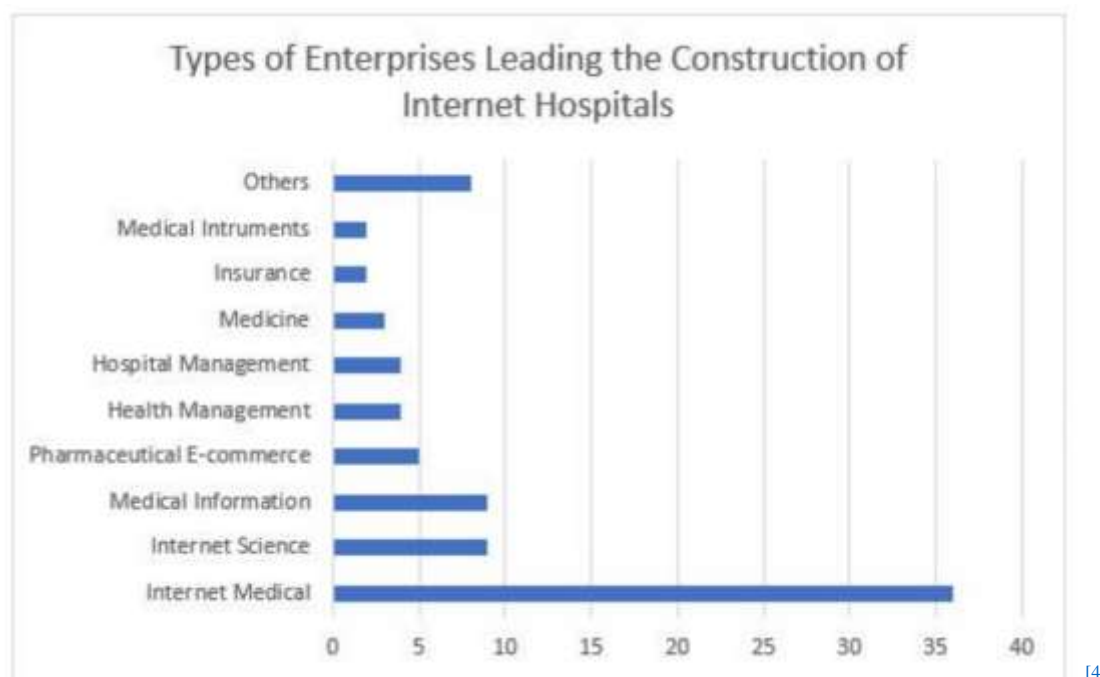
[4]

It seems that the Internet hospital return visit to patients with common and chronic diseases is only limited to the scope of consultation, but there are still various types of enterprises choose to participate in it. From the above we can clearly see that the early leading Internet hospitals are mainly Internet plus medical, Internet technology, medical information technology, medical and electrical enterprises and other emerging enterprises. With the passage of time, the enterprises involved in various sub sectors are increasingly diversified, including upstream medicine, health equipment and downstream insurance companies.

Medical demand is not a high-frequency demand, and online consultation is strictly defined. Therefore, various new types of medical institutions invest a lot of costs in Building Internet plus hospitals, not only on the important part of online inquiry, but also with certain compliance and effective means to fully open their business closed-loop.

For example, under the impact of the modern drug circulation pattern of China, such as the drug collecting policy of the state, pharmaceutical companies can creatively develop new marketing channels and service modes; medical devices should work together with the medical institutions under the line with the Internet plus the hospital as the main entry point. And because the insurance company moves forward the relevant business

links through the Internet hospital platform, it can better manage the health of customers, reduce the occurrence of diseases, greatly reduce the cost, or accumulate medical data, and then design their own products more reasonably.

2. Future business focus of Internet hospital2. Future business focus of Internet hospital
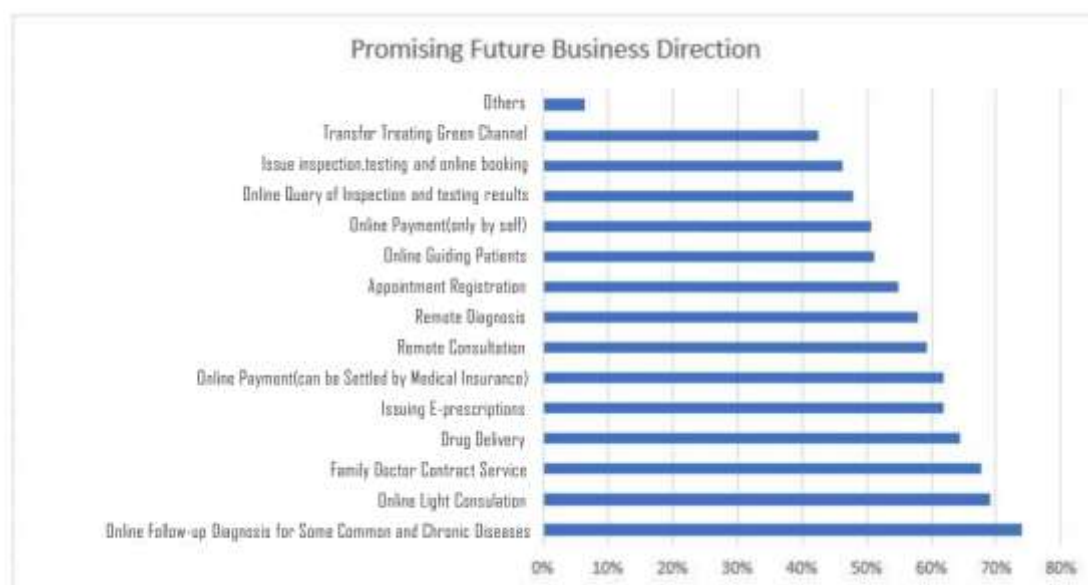
Considering the particularity of the medical industry, for example, western medicine needs to see, touch and listen, while traditional Chinese medicine needs to look, hear and ask, which to a certain extent fixed the development direction of Internet medicine. In the figure above, we can clearly see that the main business directions of Internet hospitals in the future include online follow-up of common and chronic diseases, online light consultation, family doctor signing service, and drug distribution, etc.

3. Application of artificial intelligence, 5g transmission, 3D imaging and other advanced technologies

In terms of AI technology, most of the problems of patients are that AI robots can replace doctors in advance to consult and obtain these basic information. It has been studied that an average of 13 questions in doctor-patient communication can be

diagnosed and judged. There are 7 to 8 questions in front, mainly collecting basic information, as long as it is based on the knowledge base. The problem is: it doesn't need to take up the doctor time, so the overall efficiency of consultation is greatly improved.

Taking PingAn good doctor as an example, he proposed the idea of "building a new ecosystem of Internet hospital with AI medical technology", and has reached strategic cooperation with nearly 50 domestic large hospitals, such as aviation general hospital of China Medical University in Beijing, the second hospital of traditional Chinese medicine of Sichuan Province, the fourth Affiliated Hospital of Nanchang University, and so on, concentrating the advantageous resources of all parties to jointly create a new "Internet hospital" [5].The "hospital cloud" system is used to connect with his system of cooperative hospitals to form a three in one management platform of online diagnosis and treatment, prescription sharing and health management.

Yifu Zhao Hospital Affiliated to Medical College of Zhejiang University cooperated with Zhejiang Unicom and Huawei to establish 5g Innovation Center project. Mobile ward round, mobile health care, complete link of monitoring equipment, remote first aid, remote consultation, doctor teaching, surgical robot and remote surgery have made a series of leaping progress in the innovation and application of Internet medicine. By sorting out more than 2.5 million electronic medical records data in the hospital, Yifu Zhao Hospital has led the research and development of a general clinical intelligent assistant decision-making system, and built a medical knowledge map covering more than 600000 clinical professional ontologies and logical associations. Based on the current clinical science knowledge base and reasoning model, this AI reasoning engine can realize the reasoning and analysis of patients symptoms, signs, disease history, screening and examination results, and the accuracy rate is as high as 90%.[6]

4. The future construction of Internet hospitals will focus on county-level primary medical institutions4. The future construction of Internet hospitals will focus on county-level primary medical institutions

The primary medical institutions in the county benefit most from the development of Internet hospitals, which can dock more experts and medical resources on the Internet hospital platform. County level hospitals need to introduce a large number of high-quality expert diagnosis and treatment resources due to their insufficient ability to allocate diagnosis and treatment resources. However, chronic disease management, health insurance management, recovery after serious illness, community rehabilitation and elderly care are all based on the community, which are integrated in grass-roots hospitals and hospitals below the district and county level. These grass-roots medical institutions need to rely on the Internet diagnosis and treatment platform to do a good job Home resource allocation.

5. Medical institutions lead, third-party institutions provide technical support "the two sides cooperate to build an Internet hospital model

It promotes the cooperation between public medical institutions and enterprise platform internet medical institutions in terms of policy. This is because the system, mechanism and organizational structure of public hospitals are not enough to support a real Internet hospital. But if public hospitals are not involved in the development of Internet hospitals, there may be chaos without bottom line in cosmetic medicine.

From the perspective of hospital marketization, the more popular mode is the active intervention of public hospitals and the direct technical support provided by Internet enterprises. And all medical institutions registered in accordance with the law have the qualification to apply for the construction of Internet plus hospitals. Some hospitals are still in a wait-and-see period, and need to seriously think about how to operate and manage.

From the hospital point of view, what we want is that our doctors and patients will not be lost, it does not need to spend a lot of cost, and we need to cooperate with enterprises with mature Internet technology.

From the perspective of enterprises, the purpose is to grasp the initiative of prescription. It is difficult to find doctors when operating by themselves. If the hospital is willing to cooperate, it will bring a large number of high-quality doctors. And the enterprise can quickly transfer this mode to another hospital, a large number of prescriptions continue to flow into the enterprise, and then the enterprise distributes to the cooperative pharmacy.

Although theoretically speaking, this mode of mutual construction of Internet hospitals can achieve a win-win situation. But the reality is that the sustainable development of Internet hospitals has become a hidden worry. Some low-profile Internet hospitals have little online increment and doctors have no motivation, so their current operation is at a loss stage. Some hospitals are reluctant to let doctors practice more online, believing that online diagnosis and treatment is against the normal.

The current medical system is still centered on medical institutions (mainly public hospitals above secondary level). Doctors, patients and payers play the roles of providing medical services, seeking medical services and participating in payment services around medical institutions. However, the resource allocation efficiency, medical supply efficiency and high viscosity of medical services of Internet hospitals provide the medical industry with a path to explore patient-centered medical development. In terms of medical service supply, the public hospital system has the core medical resources - doctor resources and complete departments, equipment, medical operation process configuration, but its medical service for out of hospital scenes has been in a state of being unable to reach for a long time.[7]

For the traditional hospital online, the current online follow-up, e-prescription and online audit services, to some extent, are still just a kind of convenience services, which has limited value for the growth of hospital business. Unlike the construction of hospital led Internet hospital, the development of enterprise platform Internet hospital is more driven by market demand.[8]

At present, public hospitals begin to build Internet hospitals on a large scale. The core services of most enterprise platform Internet hospitals, online referral and continuation, will also become the standard configuration of hospital led Internet hospitals, and public hospitals have absolute advantages in medical resources and patient flow. Therefore, differentiated development is the inevitable way of enterprise platform Internet hospital. The core goal of public health care system is to ensure the accessibility and fairness of medical services, so it is difficult to take into account the needs of service experience and personalized services. As a market-oriented service force, enterprise platform Internet hospitals can play a role in areas that are difficult for public hospitals to consider, such as health management, which is the scene of differentiated development of enterprise platform Internet hospitals.

3、 Problems faced by Internet hospitals in China

Internet diagnosis and treatment is a systematic behavior, involving a series of problems such as medical treatment, hospital, medical insurance, payment, etc. different links need to get through the Internet, and any missing or incomplete link will affect the normal operation of medical institutions.[9]

Problems and Challenges in the Construction and Operation of Internet Hospitals
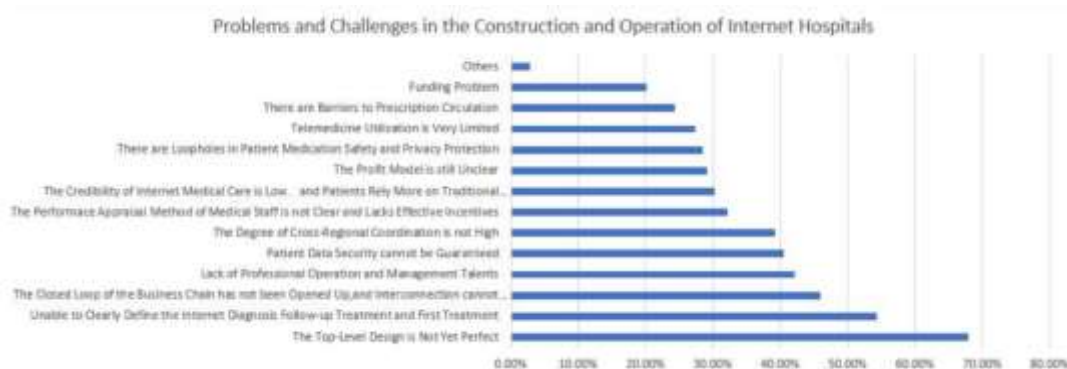
http://news.medlive.cn/all/info-news/show-165106_97.html

According to the data of the Institute of health, the top-level design of the Internet hospital construction process is not perfect, the Internet diagnosis and treatment service

can not be clearly defined, and the closed-loop of the business chain has not been opened.

1. The quality and safety of Internet medicine1. The quality and safety of Internet medicine

Internet medicine has two problems that can not be ignored, namely the quality and safety of medical care. Considering the particularity of medical behavior, such as western medicine needs to see, touch and listen, traditional Chinese medicine needs to look, hear and ask, excluding the face-to-face communication mode of diagnosis and treatment, what is the accuracy of internet medical diagnosis results? How much can accuracy based medical safety be achieved? In other words, does Internet medicine have the possibility of first visit?

2. Laws and regulations are not perfect, lack of effective supervision

At present, some laws and regulations are not perfect, which makes the internet medical industry lack of more comprehensive and effective supervision and restriction. For example, information security issues such as privacy leakage in the use of consulting services, telemedicine and mobile medical devices still need to establish a set of privacy protection laws and regulations adapted to the national conditions.

3. Top three hospitals with cooperation among Internet hospitals3. Top three hospitals with cooperation among Internet hospitals

Enterprises and public hospitals cooperate. For Top Grade 3A hospitals, the hospital itself does not lack patients, and the medical service capacity is limited. Therefore, unless the enterprise can improve the efficiency of the hospital original work and bring "high-quality" patients, the hospital participation in cooperation may be very low. For ordinary public hospitals, the service volume is not yet saturated, and the willingness of hospitals for cooperation may be stronger. So at present, the top three hospitals that

have reached cooperation with internet hospitals are generally the top three hospitals, middle or lower

4. Multi point practice policy for doctors4. Multi point practice policy for doctors

The multi-point practice policy of doctors in domestic hospitals has been implemented for more than ten years. In these years, most of the physical hospitals have set restrictions on doctors practice in the third party during the operation process. Until 2020, the epidemic situation occurs, and the situation becomes more and more obvious in the construction of Internet hospitals. In dealing with such cases, we need to further improve the management rules, otherwise it will only become a mere formality.

Because the hospital has a strict assessment and management system for the doctors in the actual organization, and most doctors are also in the establishment, even if the open policy is implemented for the third-party platform service, it will be strictly controlled by the original unit, and it is impossible to completely break away from the examination and management requirements of the entity hospital. In this way, it is difficult to guarantee the service quality of the third-party platform.

5. Internet data storage5. Internet data storage

For Internet plus hospital systems which require much higher than other industries, the early stage database is particularly important, including data import in the initial stage of data construction, data conversion in original data, database logic structure, data updating and maintenance, and the execution speed of access, which must be supported by powerful IT system before it can be implemented smoothly. At the same time, it can effectively intelligently and quickly access the existing cases and remote cases in the region, transfer and read them at high speed, conduct simultaneous triage, issue electronic prescriptions, transfer them, pay the fees in time, implement drug distribution, and establish and update the patient files. These operations can only be operated with strong it system technical support.

At the same time, it should also ensure that the patient information security and privacy will not be leaked and tampered. The second is the extension of links. For patients purchasing prescription drugs online, timely payment of medical insurance, supplement of commercial insurance, mixed treatment of traditional Chinese and Western medicine, hospital level information sharing of various departments and other problems have all formed the factors restricting the development, which is also the biggest problem that internet medical can not achieve the whole process coverage.

6. Initial visit and follow-up visit

The accreditation standards of hospitals at all levels are different from those of provincial and municipal hospitals. Most hospitals take their own as the center, and all patients who have not been initially diagnosed in the hospital must go to the entity hospital for initial diagnosis. Shenzhen People Hospital and Baoan hospital are the representatives, but there is no need to provide the medical records of the patients in the past. Shanghai People hospital needs patients to provide medical records of physical hospitals within two months. Tianjin Central Hospital needs patients to provide medical records within three months. Chongqing Children hospital needs patients to provide medical records within six months. So, for the Internet, the resources of referral hospitals can only cooperate in a limited area. Therefore, the unified standard of initial diagnosis and referral time limit must be improved from the policy level.

7. Internet hospital payment7. Internet hospital payment

There are basically three aspects of hospital payment: individual payment, national medical insurance payment and commercial insurance payment. The problems arising from the three aspects of payment appear one by one at different levels and in the process of payment. And the biggest is two aspects: the payment of national medical insurance and commercial insurance.

Medical insurance payment: Although the policy makes it clear that Internet hospitals can be included in the medical insurance payment system when they pay fees, in the process of actual operation, because of the local differences in various provinces and

cities, affected by the medical insurance fund, payment details and innovation consciousness, the implementation is extremely slow.At the same time, in the operation process of connecting the system to the inpatient medical insurance information service, the national health and medical insurance bureau also upgrades the medical information system for the inpatient medical service institutions themselves. Although the internet medical institutions have connected to the medical insurance system, from the existing data, the probability of direct income is not high.

Commercial insurance payment: as the domestic market has not yet been completely free of foreign commercial insurance companies to enter the domestic market, and the domestic insurance industry has not yet developed new insurance products to dock, it can only follow the old model. Only in the face of major diseases, the documents issued by the physical hospital can be used as the reimbursement voucher for accounting. There is no direct connection between commercial insurance and Internet hospitals. However, the access of medical insurance promotes the gradual improvement of Internet hospital infrastructure. Only when there are relatively complete governance processes and supervision links, can commercial insurance have good entry conditions and be able to fully participate in them.

4、 Solutions to problems faced by Internet hospitals

1. The promulgation of policies and the introduction of blockchain information technology1. The promulgation of policies and the introduction of blockchain information technology

In view of the quality and safety of current internet medical services, after the release of "opinions on promoting the development of" Internet medical health ", this restrictive condition is to ensure the quality and safety of medical services, reflecting the cautious attitude of the health commission. It is not that the online Internet clinic must surpass the offline clinic in terms of its security and service quality in order to really be allowed by the policy. What we should do is to judge whether the online Internet clinic can be better than the offline clinic on the whole under the condition of comprehensively

balancing the four important factors of improving the accessibility of medical services, reducing costs, improving efficiency and ensuring quality.

In order to greatly improve the application accuracy and security degree of new blockchain medical information technology on the mobile Internet, a good security solution is to introduce new blockchain medical information security technology. From a technical point of view, blockchain is actually more like an information sharing database. The large amount of commercial data or technical information stored in it has five characteristics: "unforgeability", "trace in the whole process", "traceability", "openness and transparency" and "collective maintenance". This will also help to effectively solve the complex problems existing in the current medical and health information processing (such as recording the real identity of patients, payment, test fee records, etc.).Blockchain medical technology can not only effectively promote the smooth data sharing between public hospitals and medical institutions, but also greatly improve the efficiency of hospital treatment and the accuracy of diagnosis results.[10]

2. The continuous improvement of laws and regulations has improved the enterprise management system

Focusing on safeguarding the basic interests of people health and developing the Internet plus medical health, we should rationally and scientifically adjust and adjust the price of medical drugs and the preferential policies for medical insurance payment in a timely and scientific way. It supports the "Internet plus" in promoting the city high-quality cross-border public health services resources in China, and promoting the continuous reduction of the quality of health care services, the improvement of the quality of medical services, the improvement of the fair medical environment, the medical experience, the reconstruction of high-quality medical services, the overall competitiveness and the contact with the whole city. Actively guide and promote the role of security.

In view of the network information security incidents that may lead to the leakage of personal privacy in the use of customer consulting services, remote diagnosis and mobile medical devices, this paper provides professional solutions

(1) Continuously improve the safety, stability and reliability of the current medical system. Medical institutions and individuals Social Security Bureau believes that we should further increase the protection of human resources input in social capital and related technical departments in the construction of Internet plus medical technology platform services, and be responsible for forming platform information security technology departments. It provides a strong technical support for the information security and development of the Internet plus medical service platform project. Regular real-time scanning of medical network potential security risks and network trojan virus on a large number of medical database contents of professional medical institutions effectively ensures the safety and normal use performance of a large number of medical data.

(2) Establish and improve the supervision and management system.① Data segmentation. The main purpose of the so-called data segmentation control measures is to protect and control the query authority of enterprise individuals and medical institutions on relevant data information, which can greatly improve the level of data management, reduce the risk of data information leakage in the process of data query, and even one of the data or the system will have problems, It can also monitor and control these data information through one of the parties, reducing the risk of data information leakage and economic losses.② Establish and improve the accountability system. For example, for the departments and individuals whose information is leaked due to incorrect operation, we should conduct tracking research according to the severity of the actual situation, so as to improve the level and standardization of medical information database management.③ Establish a sound technical personnel training system. In order to effectively improve the safety management level of medical enterprise database in China, it is necessary for professional and technical personnel to learn and train safety knowledge and emergency skills regularly. Once there are potential safety hazards in medical enterprise database, they need to be solved in time.

(3) Organize the formulation and research of relatively perfect relevant laws and regulations. With the development of Internet plus medical information technology and medical business, the outstanding problems related to the current Internet threat and medical information security have been formulated and perfected and the relevant laws and regulations of the state have been perfected. At the same time, local government departments at all levels also proposed that they should continue to strengthen the supervision, law enforcement, inspection and guidance of the financial and medical information industry.

3. To attract the participation of Top Grade 3A hospitals by enhancing the popularity of the hospital and the influence of academic disciplines

Through the in-depth construction of mobile Internet comprehensive medical information service, the international popularity of the top three hospitals has been greatly increased, as well as the ability of international influence and social radiation on the hospital academic and medical specialty. We should strive to build it into a national comprehensive medical service center as soon as possible, so as to attract the top three hospitals in China to actively participate in it as soon as possible.At present, Beijing Chaoyang Hospital has invested in the establishment of the national medical imaging technology diagnosis and testing service center. The Chaoyang Hospital in Beijing Medical Association has fully realized that users can take photos directly in the Chaoyang Hospital community, and the diagnosis and testing report is made by an attending radiologist from Beijing Chaoyang Hospital.Finally, the whole radiation medical diagnosis system within the Chinese Medical Association is consistent in technology and quality.

At our national leading level, Beijing Chaoyang Hospital is also taking Beijing Tianjin Hebei region as the core of clinics, and gradually expanding to hospitals above the county level. County clinics in various regions are regional medical service centers led and built by the state.

In response to the national policy of "grading diagnosis and treatment" and "homogenization of medical resources", we effectively integrated the characteristics and advantages of medical experts, doctors and doctors, increased the coverage of medical services in time and space, and broadened the scope of medical services. The hospital has a special "telemedicine center" department, which is managed by special personnel.

The telemedicine center is a remote sensing medical service organization based on mobile Internet, complete information and non-destructive automatic diagnosis; the system platform uses video data transmission device ix-5000, which is composed of three main parts: high-definition remote consultation room, telemedicine platform and remote consultation terminal.

In addition to HD teleconsultation, teleconsultation service terminals are set up in the conference room, respiratory department, heart center, image processing center (Radiology), image processing center (ultrasound) and other professional departments in the hospital. Now the hospital is planning and building a digital operation laboratory, which will be more convenient for remote operation broadcasting and teaching.

4. Advocate multi-point practice of doctors, improve laws and regulations, and ensure the source of high-quality medical students on the third-party platform

It is very difficult for the chief leader of a hospital to make up his mind that doctors practice more in the existing resistance. The basic salary and funds of doctors need to be well matched, and at the same time, we need to ensure that the hospital can successfully complete medical and emergency services.

There should be a contractual relationship between hospitals and medical practitioners. Doctors should at least enjoy a certain degree of freedom of practice at the same time under the premise that diseases can not be out of control. Doctors can not only effectively meet the different needs of the whole economic society for clinical medicine at different stages of development by setting up a practice organization in a multi-point, which enlarges the practice value of these doctors, but also can help doctors to help

other higher medical institutions and medical institutions to improve their clinical medical technology service level.

From the perspective of hospital management, the president pays more attention to the safety of diagnosis and treatment. He supported the doctor to practice more in the field of surgery, but he still needed to control it moderately.

After the implementation of the "new Internet Medical Regulations", there are different views on whether doctors in Internet hospitals need to practice more. Opinions differ. Internet hospitals belong to medical institutions. Practitioners should go through multi-point practice procedures to carry out Internet diagnosis and treatment and obtain prescription rights. Internet hospitals belong to medical institutions. Practitioners should go through multi-point practice procedures to carry out Internet diagnosis and treatment and obtain prescription rights. According to Article 14 [4] of the current "medical practitioners law" and Article 2 and Article 8 [5] of the "prescription management measures", medical practitioners can only carry out medical treatment, prevention and health care business in their registered practice units, as well as the corresponding prescription rights obtained by their registered practice units. According to the above provisions, only doctors registered in Internet hospitals or carrying out multi-point practice approval and filing can obtain the relevant prescription rights of their Internet hospitals (i.e. Pharmaceutical Research Institute).In view of the fact that Internet hospitals usually use "doctors registered in other medical institutions to carry out Internet diagnosis and treatment", if these doctors need to obtain prescription authorization, they still have to go through a multi-point practice record or registration procedures.[11]

The multi-point practice procedures of Internet hospital practitioners can be handled easily and electronically. According to Article 6 of the measures for the administration of Internet hospitals (for Trial Implementation), the provincial administrative department of health and health education shall set up the medical information service data supervision information platform of Internet public hospitals at or above the provincial level through the network to seamlessly connect with the medical information supervision platform services of other Provincial Internet private hospitals,

so as to realize real-time information supervision. According to public statistics, Yinchuan Internet hospital "multi-point practice of medical practitioners" procedures have been launched on the provincial National Internet in-patient medical and health service information supervision and management platform, and has substantially carried out multi-point electronic filing or online registration, That is to say, the "provincial internet medical service supervision platform" established with the assistance of the provincial health administrative organ has "substantially" provided "multi-point practice" procedures for residents who practice in or outside the province.

5. Development of medical big data

With the steady acceleration of the construction and development of China national medical and health informatization system, the information types and application scale of medical and health informatization application data are also growing at an unprecedented rate, which has been growing rapidly, Even some of the most mainstream information software technology tools in the international market can not be fully utilized to a great extent, In a reasonable information space, it has basically reached the important point of timely acquisition, management and timely data integration, which can effectively help hospitals at all levels to make more positive and correct medical management decisions. What's more, such a huge information collection system of public medical institutions is completely specialized, characteristic and complex. After simple data analysis or carding, it can be roughly considered that they can be filed together into the following four information frameworks:

(1) Some medical related health information generated in the process of medical treatment of medical patients;

(2) Patient related clinical basic research and clinical laboratory data in China;

(3) Based on China medical pharmaceutical industry companies and medical life sciences;

(4) Health risk management brought by the promotion of medical intelligence and wearable medical devices in China.

After such a large number of clinical trial analysis data, disease diagnosis analysis data and the life behavior health survey data of community residents in major cities are collected and integrated, they form these important data in the field of clinical medicine and medical social health, They have gradually and completely presented their main characteristics in the field of clinical medicine and medical social health science and technology,

In China, the medical data is mainly concentrated in various hospitals. In order to obtain the medical data in the existing information systems of the whole hospital, it is necessary to do a lot of "interface" work with the original medical manufacturers, which costs a lot of economic funds and time, and these are due to the lengthy and complex mutual cooperation and coordination between the manufacturers and personnel involved in various medical information systems.

6. Gradually open internet medical activities for newly diagnosed patients

Taking the national innovation driven development and reform pilot zone project in the field of digital service economy as the main carrier, we should deeply explore and actively promote the first visit system, appointment system, classification system and service system based on Internet online medical service,We have carried out a number of reform pilot projects, implementation scheme exploration and related application results promotion, such as payment settlement system, payment service standard, online drug sales, hierarchical comprehensive diagnosis and treatment, telemedicine conference, family nursing physician, online medical service system of online medical ecosystem based on Internet.

Hebei Province (xiongan New Area), Zhejiang Province, Fujian Province, Guangdong Province, Chongqing city and Sichuan Province will have the opportunity to take the lead in pilot internet medical insurance first visit system.[12]

This will also be the first time that internet medical insurance will be included in the reimbursement of employment and medical expenses at the level of national policy documents. After the opening of the policy, it is conducive for primary medical

institutions to increase the service coverage for patients, further open the hospital wall, and reshape the hierarchical diagnosis and treatment mode, that is, primary medical institutions "first diagnosis + common diseases", and grade a "severe + difficult and miscellaneous diseases".

5. The implementation of Internet hospital is matched with the government medical community and Medical Association

1. Entity hospital leading vs enterprise leading

The number of patients in local public hospitals is limited, the total working time of doctors is also limited, and the overall resources are easy to see and peak, so the physical hospital can do it well, but it is very difficult. And these platform type internet medical institutions can face all the patients in the country as long as they use the server, and they can make them bigger, but because the resources of doctors are not easy to get, and there is no need to do them well.

From the analysis of the development of Internet plus hospitals, all 27 or more prefecture level cities can be divided into three categories:

(1) Hainan and Ningxia are the regions dominated by enterprises. Both of them maintain a fair and open view on the Internet clinics operated by enterprises in China.

(2) The major cities in the key areas of internet medical integration driven development are Shandong, Fujian and other provinces in China. Although these large and medium-sized cities and key provinces take the personnel of operating entity inpatient medical institutions as the main service operators, they fully take into account the operation led by the medical enterprises themselves.

(3) Physical diagnosis and treatment hospital is the leading development area. The main cities include Beijing, Shanghai, Guangzhou, Jiangsu, Zhejiang and other coastal provinces in China. These coastal areas basically have excellent modern medical technology resources, economic development conditions, cultural level and the development foundation of physical medical service informatization. Therefore, many physical diagnosis and treatment hospitals in China are actively exploring mutual

development. There is still a huge market enthusiasm in the new medical information service mode in the era of Internet economy.

According to the main body of application, Internet hospitals are divided into private entity hospitals and private enterprise hospitals. Among the 497 large-scale medical Internet hospitals, more than 415 have become industry-leading, accounting for 83.5%. The first model is to take the medical institutions as the service subject, use the mobile Internet and other information technology to expand its service time and space, and take the concept of Internet hospital as its second service name. This model mainly refers to the public medical institutions as the main body of business: the Internet of offline hospitals, which can be divided into two types:

The hospital has built its own platform to move some doctors to the Internet for online consultation services. A typical example is Zhejiang first Internet hospital, which is led by the First Affiliated Hospital of Zhejiang University, introduces software and develops online clinics. Generally, it is a large public hospital.

The online hospital is independently led by itself, but the third-party service platform provides relevant technology and basic services for online hospital users. A typical successful example is an online hospital located in Shenzhen Baoan people Hospital of traditional Chinese medicine, Shenzhen Baoan Hospital of traditional Chinese medicine provides online diagnosis and treatment combined with clinical management services for online hospital users (mainly including online consultation, opening hospital electronic consultation prescription), health 160 provides relevant technology and service support, and 160 University pharmacy provides online distribution of medical drugs for online hospital users.

The second typical situation is that some large-scale Internet service companies and medical enterprises have successfully applied for the establishment of large-scale Internet network diagnosis and treatment service institutions to provide medical services for patients by using the medical service platform provided by these large-scale Internet medical companies. In the second practical case, although the internet medical enterprise itself is the main body of its business, it is a new Internet professional diagnosis and treatment service institution or start-up company established after the

application for enterprise registration, But what we have to do is that enterprises need a network entity professional diagnosis and treatment service institution that they can be affiliated with. No matter they are self built, acquired, or just invested and cooperated, there is only one network entity professional diagnosis and treatment service institution and professional hospital that they can not be affiliated with. Doctors are the core human resources of modern internet medical institutions in China, and physical medical institutions naturally have the advantages of this technology, but enterprises have to go through a long period of precipitation, Or pay a lot of costs in the short term, so as to accumulate and develop a certain scale and quantity in the market

(1) Enterprise LED (limited to one), for example, led by a wholly-owned company of Wuzhen micro medical technology group, has carried out strategic cooperation with local governments and large hospital institutions, and established a joint venture.

(2) Government led (it is an Internet hospital system, there can be multiple Internet hospitals), government led audit, Internet enterprises applying for Internet hospital must register Internet hospital company in the local. It is also a common and influential mode at present.

2. Combined with Medical Association, medical co-operation and regional collaborative development

The medical association mainly refers to the Medical Association in a region, which effectively integrates the medical and technological resources in the same region. It is usually a medical and Technological Association composed of tertiary hospitals, secondary hospitals, community hospitals and township medical institutions in a region.

Medical community is the main mode of Rural Medical Union construction. Focus on exploring the county and township integrated management of "county hospital as the

leader, township hospitals as the hub, village clinics as the basis", to build a county, township, village three-level linkage of county medical service system.[13]

The entity clinic and the Internet plus hospital with comprehensive strength are organically combined with the two service modes of "Internet plus" by the two service modes of "interconnected body and medical community".

3. Current situation of "Medical Union"

On July 17th, 2007, the National Health Commission announced the "measures for the management of medical consortia (Trial)" jointly formulated and officially issued by the National Health Commission and the Central State Administration of traditional Chinese medicine on its local official website, proposing to continue to speed up and standardize the management of medical consortia this year.

The National Health Commission will accelerate the pilot construction project of Regional Medical Association as an important implementation tool and effective starting point to accelerate the construction of the overall hierarchical comprehensive diagnosis and treatment service system of public hospitals in China, and jointly organized and launched the pilot construction work of Regional Medical Association in key cities and medical community in key County cities with relevant departments of the State Administration of traditional Chinese medicine,In 118 large and medium-sized cities and 567 municipal counties and districts, the pilot construction of closely linked urban medical alliance and medical community has been promoted, and the overall hospital grid layout and comprehensive management of urban medical alliance have been basically completed.

4. "Medical community": realize medical resource sharing and data exchange

The construction of close county medical community + Internet hospital is a new path to strengthen the grass-roots level of medical reform. In this system, the sharing of medical resources and the Internet of patients data generally means that therapists and medical staff can more easily view and sort out patients past disease history and diagnosis and treatment status, which provides a lot of data support for the implementation and management of hierarchical treatment.

In the era of epidemic prevention and control, Internet plus online medical care will soon develop rapidly and become an important medical tool for stratification, in-depth diagnosis and treatment, and overtaking. It is a good idea to avoid big hospitals linking resources through technology, attracting users and forming a greater siphon effect on the grassroots.

6、 Conclusion: the development process of Internet hospital in the future

1. Why build Internet hospital

(1) With the help of the Internet, the hospital implements the national hierarchical diagnosis and treatment policy, and promotes the sinking of high-quality medical resources.

First tier cities are in line with the development trend of science and technology in mobile Internet and mobile information age. 2, hospitals and hospitals have been actively engaged in Internet plus city management.

(3) As the leading medical clinic in the urban industry, the clinic of large-scale specialized comprehensive diagnosis and treatment hospital is in the industry sandwich layer. In order to make a rapid breakthrough, we must fully consider a deep cross integration with the medical resource advantages of traditional basic medicine, big health and other industries by means of information technologies such as mobile Internet, big data, Internet of things, mobile medical Internet and cloud computing,

From the perspective of different services to continuously improve its innovation ability and service level of providing health care services.

(4) further explore the development rule of mobile internet medical care, explore how various public hospitals expand and expand medical services after the emergence of Internet plus medical care, and provide decision-making basis and reference for relevant policies formulated by all levels of government departments.

(5) Through the mobile Internet, the hospital will introduce high-quality medical information resources to a wider range, let more patients and friends in the same industry to understand the hospital, improve their visibility in experts and various disciplines, and expand the influence on the hospital brand.

Compared with the traditional entity hospital, Internet hospital has incomparable advantages. The Internet plus hospital is a new thing that is considered to be a change and innovation under the Internet technology. Through the dual driving of big data and services, the Internet has promoted the allocation and flow of the primary medical information resources. It has also been able to embody the level of primary medical services and improve the efficiency of its implementation and management of grading treatment.

First of all, Internet medicine is to ensure its own resource allocation and high efficiency in the field of medicine. Internet hospital has broken the limit of physical distance, and naturally has the technology of optimizing the allocation of medical resources. Through the diagnosis and treatment from offline to online, expand its service space and business field. Reasonable drainage specialists and patients can accurately match them.

Secondly, the Internet hospital must have a good supply of medical resources and high efficiency. In the Internet-based hospital, patients can choose a variety of forms, such as graphic inquiry, telephone inquiry and video inquiry [14].When the Internet hospitals provide clinical services, the traditional medical institutions directly connect seamlessly, so as to maximize the supply and efficiency of medical resources. Finally, the gene attribute of Internet connection facilitates the long-term binding and binding between hospitals and patients, and has the natural gene to carry out telemedicine, follow-up, health monitoring management and other work.

2. Advantages of Internet hospital

A. Prevention and control: public group epidemic prevention, to avoid excessive concentration of patients and cross infection

Internet hospitals avoid crowd aggregation, which leads to cross infection between patients. Patients can book the diagnosis and treatment time online, query the clinic, and serve patients regularly.

During the period of epidemic prevention and control, prevention of crowd aggregation, effective drainage of patients, and reasonable arrangement of patients treatment time and place have become the top priority of public epidemic prevention.

B. High efficiency: precise investment of medical resources, optimization of medical treatment process and alleviation of doctor-patient disputes

If you often go to the major hospitals to see a doctor in line and see a long waiting line, sometimes conflicts may intensify. After the mobile Internet and e-commerce mode entered the traditional Chinese hospitals, the first major change brought by their business development mode was the cumbersome queuing of these hospitals.

The online consultation service of top three hospitals on the Internet has played a good role in problem elimination and timely filtering for top three hospitals. The majority of patients who directly make online inquiry and appointment for treatment in traditional top three hospitals can directly get a professional doctor solution when they go online for treatment, So that you do not have to worry about wasting the scarce online medical and health information service resources of any traditional online diagnosis and treatment hospital, and the scarce online medical and health information service resources such as doctors and sickbeds can be optimized more reasonably [15].

C. In terms of time: break the time constraints of traditional medical services for patients and doctors.

(1) for patients, one of the most important advantages of Internet plus hospitals is their convenience. Moreover, the online appointment registration and online consultation services provided by internet medical institutions greatly simplify the work flow of elderly patients and save the time of patients.

(2) For doctors: on the one hand, doctors can make full use of their fragmented time to provide patients with their own online consultation and consulting services to obtain the returns needed by other medical institutions; on the other hand, doctors can also make full use of mobile Internet to help establish and build doctors' reputation brand.

D. Technology: standardize the medical operation procedures from time to time, complete the data.

Internet medicine standardizes the doctor operation process and medical operation. At the same time, medical records can be stored in the cloud to achieve the purpose of traceability.

E. Regionally: through the link, the online consultation can be conducted across regions without difference, and the current medical resources can be reasonably allocated

The distribution of public medical service resources is relatively balanced, and the conditions of public medical service in some remote areas are still backward. The Internet public medical platform can quickly and conveniently cover high-quality public medical service resources directly to these areas.Internet telemedicine online outpatient service technology has completely broken through the radius of clinical medical information radiation coverage of traditional professional medical institutions in China, and will also make the society more conducive to our professional hospitals, continuously broaden their medical service coverage, and achieve more comprehensive medical business scale growth.

F. Cost: online optimization of intermediate links to reduce patient costs and hospital costs

The construction of Internet hospital will give full play to the advantages of Internet medicine, such as:

(1) Continue to launch multi-channel network appointment public registration, optimize the network public registration appointment service information system. At present, some large hospitals in China have gradually opened this registration function. Before the outpatient appointment, the patient chooses to make an online appointment for outpatient registration. Within the appointed time or on the same day, the patient

can directly register with the outpatient department of his hospital with the uploaded outpatient registration card, waiting for the outpatient treatment.

(2) It initially realized the wide coverage of self-service charging service and optimized the public payment management system. Many large hospitals have begun to invest in medical equipment system, and installed self-service outpatient registration and online payment of medical treatment machine, distributed in each different floor of the hospital outpatient and ward.

(3) It can effectively realize the real-time circulation of internal data and information, paperless and online circulation. For example: first, the electronic medical services of residents are all directly electronic, including electronic medical prescriptions, electronic medical records, electronic medical application forms, etc.; second, the electronic operating system of medical service management of residents is reformed, It realizes the operation process that the resident can automatically record and read the patient information, modify the personal information after the doctor approval and automatically print the medication, and improves the management efficiency.

3. The early construction cost of Internet hospital is high

Kangkang chronic disease is a professional hospital on the Internet. In order to enable these hospital personnel to obtain the qualification related to medical services in time, they have applied to the relevant health administrative departments of some countries to become a professional medical institution. To be sure, it is basically an "operation center", It is not that there are no large-scale professional medical equipment and a few beds.

Moreover, the re development investment of "micro medicine" is still mainly reflected in biological science and medical technology. It is estimated that the overall cost of the construction of this large medical institution based on mobile Internet by micro medical technology company is about 270 million yuan, which is completed by more than 500 professional medical engineers. Therefore, at present, when the public micro medicine in Ningxia has just been implemented and developed to many Internet hospitals in

Ningxia, it is estimated that the development time of hospitals around the world is only about 10 days. On the one hand, it is also due to the fact that the diagnosis and treatment hospitals in Ningxia have initially formed certain clinical information and medical data connectivity.

From the above analysis of the industry development experience of 39 Internet hospitals, Langma medical information company spent 155 million yuan last year to purchase 66% of the shares of the existing Guiyang sixth intermediate people Hospital [16]. Recently, it once again proposed that the company plans to expand the business of the existing Guiyang Sixth Hospital of traditional Chinese medicine by raising 650 million yuan. From the perspective of online and offline investment, the amount of investment is huge.

4. For companies lacking medical qualification, there are only three ways: self construction, acquisition and cooperation

There are three ways of offline support:

(1) Self built: Although self built public hospital management service mode may not need more social capital and manpower investment in cost theory, good doctors have come out of the network as a very small and low-cost self built public hospital management service mode, that is, to set up a wholly-owned company or private public medical institution, This cost advantage and huge benefits are mainly due to the relatively small scale of its operation due to the restriction of many policies from local governments at all levels and economic society in China.

(2) Enterprise merger and acquisition: at present, only a few emerging industries and large enterprises with the background of capital market really have the capital market and real economy competitiveness for merger and acquisition."39 Internet hospital" is trying to reorganize its business after its rival Guiyang sixth hospital was acquired by Tencent.

(3) Establish cooperation through negotiation: between medical enterprises and other public hospitals. For non top three hospitals, there are not so many medical patients, and the ability to provide this medical and health care service is also limited. Therefore, unless it can greatly improve the medical work efficiency of its original

service projects and bring "high-quality" patients, the participation of the original projects and their partners may be very low.For some ordinary large public hospitals, the service volume has not fully reached saturation, and they may be more willing to cooperate with customers.

The level of the hospital also directly reflects its ability to provide customers with services, positioning and services. Therefore, not every hospital should build an Internet hospital according to its own needs or with certain competitive advantages.

If a real hospital wants to build an internet medical service institution, it can independently apply for the use of internet medical service institution as the second name, that is, it can independently apply for the use of internet medical service institution as the second name together with a third party institution, which accounts for about 10% of other internet medical service institutions dominated by the real hospital.

For an Internet hospital jointly built, both the clinic name and the company name need to be fully reflected in the name of the Internet clinic. In this way, enterprises not only need to provide support for the construction of the platform, but also need to provide customers with resources, continuous participation and other related operations.

This mode can be to explore the comprehensive coverage, construction and deep integration of operation and management ability of executors, medical and service personnel resources and operation and management platform in a physical hospital, and the two sides have formed complementary advantages in technology.

5. Ecological structure of Internet hospital

The first part, the whole health ecology, is composed of insurance payers, health service providers, health product providers, and health financial scheme providers.

This structure is directly mapped to the hospitals on the Internet, which mainly includes: local doctors customers based on the demand of medical services; providers of medical services clinics and medical institutions; providers of medical services are Health Management Co., Ltd.; medical service platforms and payers of medical service fees customers or insurers; medical service platforms and payers of medical service fees

customers or insurers; medical service platforms and payers of medical service fees customers or insurers;

Among them, in the ability link of Internet hospital itself, electronic medical record, electronic prescription and payment have been connected.

The second part focuses on the derivation of traditional structure and the development of comprehensive medical ecosystem.

First of all, it is the Internet of traditional business, including diagnosis and treatment ability and drug service. These traditional offline businesses are integrated online to generate electronic medical records, electronic prescriptions, electronic payment and so on.

The second is the Internet integration of big health ecology, including health management center, hospital alliance, specialist treatment and health mall. This kind of big health ecology is integrated by data, and the data is transmitted and retained through blockchain technology.

On the basis of the two, through the Internet hospital business, we can realize the research and development of innovative service mode from the perspective of data, and further optimize the process of intelligent underwriting and claims verification of insurance.

The Internet hospital mode of multi platform integration, multi access, multi interaction and win-win development can organically combine the data of laboratory, pathology, imaging, diagnosis and treatment, service, payment, equipment, consumables, drugs and so on.

We work together to provide one-stop medical solutions for patients, insurance customers, natural flow customers, primary medical institutions and other cooperative institutions.

Finally, COVID-19 speeded up the integration of Internet hospitals online and offline, and overcame 3 factors that hindered the development of Internet hospitals: (1) medical system and health care reform; second, regional issues: the original county countries planned medical resources according to the economic scale of East China and Southern

China; third, the realization of technology cross-border medical treatment; therefore, it developed rapidly.

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