

**Research on the Construction of Electronic Medical Record under the
Background of Medical Big Data**

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Abstract: The hospital has entered the era of big data. The traditional manual medical records are no longer suitable for the recording of massive medical data. The electronic medical record silently replaced the traditional manual medical records and became a trend of digital medical development. The sources of medical big data are complex, varied in types, varied in structure, and diverse in format. The development of electronic medical records is inseparable from the support of medical big data. The future of big data depends on extracting value from a large amount of untapped data. However, most new data are based on unstructured data that are marked as documents. People know little about them and their utilization is also low. Based on this background, electronic medical records encounter challenges such as insufficient integration of data, over-simplification of versions, lack of uniform standards, low security, and low sharing. The expansion of electronic medical records from the field of health management to the field of life management has become increasingly important for people. Therefore, in the process of generating electronic medical records, all relevant parties must take it seriously.

Keywords: Hospitals, large medical data, electronic medical records, security.

1. INTRODUCTION

The Internet is the foundation for the development of modern society and affects people's work, life and interpersonal communication. The network products such as social media, virtual services and collaborative authoring have made the network data show an explosive growth rate, making it difficult to apply current conventional tool software for recording, processing and processing. International Data Corporation (IDC) in the digital universe research report "Big Data, Bigger Digital Figures, Maximum Growth in the Far East" pointed out that the scale of the digital universe in 2013 reached 2.8ZB, and IDC expects the scale of the digital universe by 2020. Will exceed expectations, reaching 40ZB; Moreover, China's data growth is most significant, and will account for 21% of the world in 2020. There is a wide variety of opinions on the concept recognition of big data. One commonly accepted view is that the amount of data accessed by a certain data has reached a very large extent, which has made it difficult to capture

using the usual tool software. Management has been processed, and its data volume can usually reach PB (1024TB) level. For the characteristics of big data, it is generally attributed to four aspects: Volume, Variety, Velocity, and Value. That is 4 V. The characteristics of the four big data mentioned above are more focused on the nature of data, but in reality, big data is a more general concept, and its contents are also quite extensive. The global utilization rate for big data and the extraction value rate are only 0.4%. The future development trend of society depends more on people's extraction of the value of big data. Therefore, the "big data" era has arrived, no matter from which aspect it is understood [1].

The development of informatization also promoted the construction of hospitals, and the emerging electronic medical records slowly replaced the traditional manual medical records. This not only saves the doctor's visit time, but also solves the traditional "birthday medical records" problem. With the rapid spread of electronic medical records, a large number of patients' medical information exists electronically in the medical information system. After continuous accumulation, various forms of electronic medical systems have produced large-scale medical big data, and the database's data has been increasing in large data units every day. After mastering these internal data, the hospital has taken the initiative and improved its own core competitiveness. At present, according to many studies in the United States, it can be seen that electronic medical records are an electronic management method that can manage all personal health data and health information in an all-round way. It can be used not only as a traditional clinic but also as a tradition. The case information, but also to meet people for all medical treatment and legal appeal. It is equivalent to summarizing all the information of a person. Through the integration of patient data, the overall grasp of the patient can be fully achieved. The role of the electronic medical record itself also changes from the simple record-changing process to the realization of medical quality control tracking [2]. As part of the overall framework of the hospital information system, the electronic medical record plays an important role in the development of the hospital information system. Therefore, considering the informatization perspective, electronic medical records have become a trend. Big data exists as a new driving force that not only helps hospitals greatly improve medical performance, but also enhances the competitiveness of hospitals. Researchers have conducted extensive discussions on the role and effects of big data applications in the fields of medical care [3-5], telecommunications, manufacturing, supply chain, and urban construction. The hospital's research on medical big data has become the focus of hospital electronic medical record development. At present, how to use these big data resources to provide integrated management, diagnosis and treatment services, and research and teaching for our healthcare industry has become a hot issue of concern to the society [6].

This article mainly discusses from two aspects: First, the difficulty of medical big data in the application of electronic medical records, and second, how to solve the difficulties in the development of electronic medical records. The aim is to find a solution that can provide a decision support for the combination of medical big data and electronic medical records.

2. KNOWLEDGE OVERIEW

Big data is not a simple new technology, but is another disruptive technological innovation in the IT industry following cloud computing and Internet of Things [7-8]. The combination of big data and healthcare has rapidly emerged as a hot spot for digital healthcare. The data generated in this project is medical big data. According to the study of CCW Research, an ICT research institute, the hospital's awareness of the concept of "big data" is 91.8%, and it is generally in the "cognitive" stage.

In BI2.0 (Era), where traditional business intelligence and big data are combined, the proportion of unstructured data is over 75% of the entire data volume of the Internet. They come in a variety of forms, such as office documents, texts, pictures, reports, images, and so on. The medical big data is structurally subordinate to non-structural data such as X-ray photographs, pathological sections, MRI, fundus image photography, and so on. Unstructured and semi-structured data in modern hospitals account for about 85% of total data, but most hospitals are powerless for these data. It can be seen how important it is to increase the decision-making value of unstructured data.

The Morgan Stanley report pointed out: In 2013, the medical industry was the fastest growing area for big data. The developed countries have taken the initiative in this regard and have achieved some results. Such as big data analysis can help the U.S. medical service industry to create 300 billion U.S. dollars a year, Google's success in H1N1 flu forecasting, and so on. At the company level, Life Technologies, the biggest player in the field of gene sequencing, is also adopting cloud storage and data analysis solutions to suit development. Individually, Harvard University's Andy Beck uses image analysis solutions to analyze a large number of image features and discover new biomarkers that can be associated with clinical outcomes.

Big data is relatively conservative in its application in the medical field in China, but related deployments have also started. For example, in March 2015, the State Council issued the "Circular on Printing and Distributing the Outline of the National Health Care Service System (2015-2020)" which emphasized the need to strengthen the research and construction of medical informatization, promote the level of medical and health services for all people and The application of data. By 2020, we will basically implement three large-scale databases, including population information, electronic data health records, and electronic cases, to achieve dynamic updates and coverage of population information throughout the country. The scale of investment in national health industry informatization is also growing. It can be seen that medical big data has very broad development space.

The United States was the first country to start researching electronic cases and it has been at the advanced level in the world. According to statistics, in the United States, hospitals that used the electronic medical record system as early as 2003 accounted for 13%, and this figure increased to 19% by 2004. Around 1970, in the community medical care in the Netherlands and the United Kingdom, they began to try to use the electronic case system to record the patient's condition. This measure has provided a good help in the later diagnosis and treatment of diseases and statistical data [9].

At the 6th China Medical Informatics Conference held in 1994, the Ministry of Health proposed that “it is hoped that by the year 2000, there will be several hospitals in the country that truly implement a complete CPR system”. Although after more than 20 years of exploration, China's electronic medical records have made considerable progress, but compared with developed countries, our gap is still very large. For example, there is an imbalance in the use of electronic medical records between regions, there is no uniform data standard, and so on.

Electronic medical records are the foundation of digital medical development. The original electronic medical records only replaced handwriting with machine-playing. The medical records template was mixed and there was no unified structure document. This caused medical records data to be systematically analyzed and shared, which was not conducive to digital medical treatment. Development of. With the development of the electronic medical record system, a complete set of electronic medical records has been established. According to the granularity of information expression, it can be divided into folders, documents, chapters, basic elements and some parts of the nested relationship.

3. ELECTRONIC MEDICAL RECORD DEVELOPMENT CHALLENGE

3.1 Low medical record integration

First of all, it is very difficult to collect and integrate a large number of heterogeneous data that are attached to various medical and health institutions under the medical and health information sharing platform. The data quality of existing platforms is not ideal [10]. Therefore, historical medical data concerning the life and health of an individual must be accurate. Error is not inherent in big data, but it is a real problem that needs to be dealt with, and it may exist for a long time.

Second, the hospital lacks awareness of the integration of electronic medical records and lacks a national-level electronic medical record sharing research project. Now hospitals' utilization of electronic medical records is much lower than that of developed countries. The construction of informatized medical records makes it possible to integrate medical records. Because there is commonality between diseases, hospitals should integrate the electronic medical records of patients with the same disease, draw the development curve of the disease through data analysis, and obtain as far as possible the high age range of the disease, and what the disease has in different age ranges. What are the different symptoms, what are the symptoms of the disease when it is initiated in different populations, and the actual treatment time and survival time of the disease?

3.2 Lack of uniform standards

The realization of electronic medical records is a long-term process, and the understanding of electronic medical records varies from person to person [11]. To establish an integrated and integrated hospital integrated information platform, the key is to integrate all data sets and reduce the technical threshold for sharing data. Due to cost-benefit issues, hospitals will choose to cooperate with many companies with higher cost performance. This makes the current

electronic medical record systems in hospitals come from different manufacturers, there is no unified standard, and the data in different hospitals is very different. Difficult to achieve sharing, which is easy to form an "information island", even if the hospital's internal consulting rooms because of doctors accustomed to different or other reasons, it is difficult to achieve data integration.

At the same time, in order to maintain its own advantages and independence of data, various types of hospitals in China are developing electronic medical records with their own characteristics according to their own needs or independence, which will lead to different versions of the same conditions in different hospitals. Cases. There is also diversity in its standards, so that the same information is expressed differently in different systems. For example, the same is the price of drugs, which is called "price" in the A system, "medicine price" in the B system, and "medicine price" in the C system, and other systems use English words to express. The data is like being scattered in a separate information island, making data analysis impossible.

3.3 Single medical record version

Most of the current electronic medical records are simply textual descriptions. This kind of power medical record is slightly weak and unfavorable to doctors. The trend of the development of electronic medical records in the future is to use a variety of formats to describe the electronic medical records in a comprehensive manner. The electronic medical records are combined with pictures. For example, adding electronic examination records and diagnostic images to electronic medical records enables doctors to view various types of medical records. The patient's disease data provides accurate and rapid judgment of the patient's condition and can make the most accurate medication decision in the shortest time.

3.4 Low security and privacy

In the era of big data, the potential value of data is increasing endlessly. For the collection, storage, management, analysis and sharing of massive medical data, information security has become one of the most prominent concerns and hot spots. Electronic medical record contains a large number of personal privacy information, such as the use of electronic medical records can analyze the personal medical insurance and other conditions. In the United States, the Food and Drug Administration (FDA) has begun to step by step to open big data on health care and health to the community. The National Security Agency (NSA) has used the data value to identify individuals. By collecting data samples from millions of neonatal intensive care units, he can determine which newborns may be involved in potentially fatal infectious diseases. However, such large data integration has led to the leakage of personal information more or less.

According to the "Big Data White Paper" released by the United States in 2014, it can be seen that more and more personal information output has been controlled and kept by individuals other than individuals, so ensuring data security has become the most current An important part. "At present, the United States and Europe impose heavy penalties on the loss of patient personal and medical data, and require all health care institutions to comply with HIPAA's

privacy and security regulations, conduct safety training for all employees to protect patient privacy data, and promptly notify users of data. Leaking incidents. At present, China still lacks relevant privacy regulations for big data applications.

Therefore, how to ensure the safety of big data and the reliability of analysis results are new topics that need to be solved in the field of information security. In the combination of medical big data and electronic medical records, finding a balance between the openness and protection of personal information is another major challenge raised by Big Data.

4. CONSTRUCTION SUGGESTIONS

4.1 Cultivate professionals

Hospitals should regularly train professionals in big data applications. These people should be “big data engineers” who have mathematical knowledge, IT skills, business knowledge, and can be used as “pioneers” for big data applications. At the same time, employees should be encouraged to become familiar with the business operations under data-driven decision-making, be able to conduct comprehensive analysis of big data, tap the potential value of medical big data, and lead hospitals to span the “data gap”. In view of the importance of the value of big data, the hospital establishes specialized departments to collect, process, process, and store professional medical big data as much as possible, diversify the value of data, and improve the hospital's competitiveness and academic research capabilities.

The application of big data is a “one-on-one” project, and the importance of leadership is the key to success and failure [12]. Hospital leadership should be able to actively change data thinking, change the traditional data strategy, increase investment in human resources, and support the in-depth application of big data technology. While carrying out diversified knowledge competitions to improve the quality of employees, it can also transform the internal atmosphere of the hospital and adopt a series of measures to promote the continuous improvement of their data application skills. Facilitate the communication, sharing, collaboration, and elimination of “data islands” among hospital decision makers, managers, business personnel, and data engineers based on data analysis and data applications, promote the diffusion of big data application technologies within the organization, and internalize the organization as a whole. skill. Provide professional data application technology services.

4.2 Conduct customer relationship management (CRM)

The so-called customer relationship management (CRM) is simply to attract and retain customers with economic value [13]. At present, CRM is more devoted to the business field and creates maximum profits for the commercialists. However, CRM in the medical field is still a relatively new field and therefore has great potential for development. In the medical and health field, the hospital also needs its own customer base.

According to the practice of long-term market competition, it can be found that 80% of the profits of a company are generated from about 20% of key customers, similar to the fact that 20% of managers in an enterprise bear 80% of the responsibility of enterprise management. As a result, companies are placing too much attention on this group of key customers. According

to this part of the customer's needs for personalized customization, will as much as possible to retain this part of the group, so that it becomes their loyal customers, so as to ensure the long-term stability and stability of corporate or hospital mainstream profit or income.

The core part of the research on the basic theories of medical customer relationship management is the study of customer relationships. On the one hand, the hospital's development needs to be supported by academic research capabilities, and on the other hand, it is based on patient satisfaction. Hospitals should use technologies such as data warehouses and data mining to discover, establish, and optimize customer relationships [14]. This process emphasizes only discovery. From the collection and analysis of patients' electronic medical records to the search for valuable customers through data mining, it is actually the process of continuous transformation of explicit knowledge and tacit knowledge.

At the same time, emphasizing the use of information technology to build a CRM system is also the focus of customer relationship management. From the collection of electronic medical records to the formation of electronic archives, professional CRM management is performed so that patients can understand their physical conditions better than patients themselves.

4.3 Build standardized shared medical records

The establishment of a unified, targeted and feasible evaluation criteria is the key to improving and quality. [15] In order to achieve specialization, different clinics should establish different assessment priorities for electronic medical records. Due to the different habits of each doctor, personal subjective factors should be avoided in the filling of electronic medical records, referring to the uniform filling criteria and the use of uniform medical terms. In order to address the issue of overuse of electronic templates, efforts should be made to strengthen doctors' understanding of the importance of electronic medical records. Clinicians should not rely too much on the copy-and- paste function of electronic medical records. Clinicians should give explanations for the same or similar electronic medical records. In the process of generating electronic medical records, doctors, nurses, and other staff in hospitals should perform their duties with due diligence. At the same time, corresponding to the implementation of electronic medical records, the chief physician, the attending physician, and the chief of the department conduct real-time monitoring.

The phenomenon of “information isolated islands” has always been a criticism of the development of health care. In order to pursue its own development, hospitals often shut down information for some patients and stabilize their position. With frequent population movements, “different visits” have become a new trend. Due to the hospital's self-protection mechanism, patients often have to spend a certain medical cost to create duplicate electronic medical records when they visit the clinic. They usually repeat the examinations performed at a hospital. This will not only waste medical resources, but also increase the cost of patient visits.

Therefore, the realization of data sharing between hospitals becomes a new requirement. The relevant state departments should formulate relevant laws and regulations and eliminate the self-protection mechanism of the hospital. Hospitals should also increase their open window to achieve the sharing of medical data. To establish a key mechanism, the patient only needs to go

to a remote hospital with his digital certificate key to see the doctor. The doctor can then query the patient's situation in the electronic medical record network system and achieve digital management.

4.4 Improve medical records function

Strengthen publicity and training, so that doctors really understand the use of electronic medical records, and fully understand the structural advantages of electronic medical records. First of all, not only should there be relatively uniform specialized templates, they can automatically form common information for some ordinary patients. Second, the use of electronic medical records of intelligent prompts, a variety of clinical guidance functions to regulate medical behavior [16].

Combine the doctor's condition records, establish some intelligent query connections, and medication tips. In particular, in recent years, various clinical specialties have continued to formulate standardized treatment specifications for certain common diseases and further developed the electronic medical record system to expand the space, so that new medical technologies and optimized medical solutions can be better utilized; again, the functional departments Check the test results in real time, abnormal results refueling reminder function, the doctor can be the first time the patient's latest physical condition response.

Extend the doctor's and patient's visit time, even if the patient leaves the hospital, you can also understand the patient's development situation through the electronic medical records, and do a good job of follow-up medical services. The hospital should set up a special information system department, focus on expanding the actual functions of electronic medical records, and realize the networking of seeing a doctor.

5. CONCLUSION

Medical data is the most powerful assistant for electronic medical records. Through the integration of medical big data and the digital development of electronic medical records, hospitals have also entered the real "big data" era. Based on continuous disease changes and the quest for health, data integration between patient records and professional customer relationship management methods will help medical data be used accurately and maximized in electronic medical records. It is helpful for the development of digital medical and personalized medicine. Based on the development of network conditions, the confidentiality of electronic medical records has become the most dazzling focus in the future. On the one hand, it is necessary to strengthen the quality of relevant personnel of all parties. On the other hand, computer networks such as the virus aggression also need to be overcome by technology.

The development of electronic medical records reflects more of the development of digital and individualized medical care. At the present stage, hospitals are basically treating the patients point-to-point, and based on the patient's physical performance, they make basic judgments about the patient's condition and medication. This can also be called individual medical treatment. What is the difference between personalized medicine and that? The definition and difference between the two also need to be complete. However, it can be determined that the

individual medical care at this stage is aimed at the patients in the hospital. For patients who have left the hospital, most hospitals and doctors do not pay any attention. The electronic medical record is more like a "vehicle recorder," and records your health from time to time. Hospitals and doctors will also pay full attention to you. All this is the entry point for digital and personalized medicine. Given how large the population base is, how to achieve truly individualized services is a problem that medical care must try to solve in the future.

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