Research on Information Sharing Technology of Mental Health Alliance Based on Multi-source Heterogeneous Data Fusion Algorithms

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ABSTRACT. *Mental health undertakings in Suzhou have developed in an all-round and healthy way. The "Suzhou Mental Health Specialist Alliance" led by Suzhou Mental Health Center was formally established. The aim is to set up a technology sharing platform to realize mutual sharing of medical resources; implement quality homogeneous management to improve the efficiency of specialized medical services; establish a pairing support mechanism to improve the level of prevention and treatment of specialized diseases at the grass-roots level; strengthen scientific and technological cooperation to enhance the academic research capacity of specialized hospitals; smooth the way of mass medical treatment and reduce the difficulty of referral of specialized patients. Using multi-source heterogeneous fusion algorithm technology to solve the problem of "data gap" in each unit of the alliance. Re-construct the information sharing platform of the spiritual specialty alliance with the spiritual specialty alliance as the main body from the technical framework. Communicate the data of major mental health institutions in Suzhou, and consider the corresponding security and privacy precautions from the security aspect. Guided by the information sharing platform of the Mental Health Alliance, we can give full play to the advantages of mental health specialty, better implement graded diagnosis and treatment and meet the health needs of the masses, and promote the comprehensive and healthy development of mental health in Suzhou.*

KEYWORDS: *data fusion, heterogeneous systems, spiritual alliance, information sharing*

1. Introduction

In order to carry out the requirements of the National 13th Five-Year Plan for Medical and Health Service System, the Opinions of the General Office of the State Council on the Implementation of the Construction of the Graded Diagnosis and Treatment System and the Implementation Plan of the Jiangsu Health and Family Planning Commission on the Construction and Development of Medical Consortium, and to give full play to the complementary advantages of the regional mental health specialties, we should implement the graded diagnosis and treatment and the two-way system more comprehensively. Referral service can meet people's mental health needs and promote the comprehensive development of mental health and mental health in Suzhou. The "Suzhou Mental Health Specialist Alliance" was established by Suzhou Mental Health Center. Establish a reserve of regional spiritual and psychological experts, and arrange regular visits among experts within the alliance. Strengthen the business guidance and technical support to the alliance member hospitals, and make a unified education and training promotion plan. The alliance is composed of Suzhou, Changshu, Kunshan, Taicang, Zhangjiagang, Wujiang and other mental health institutions. It is a beneficial exploration and practice to promote the complementary advantages of mental health and mental health in Suzhou and to improve and serve the masses together.

2. Purpose

Construction objectives: To set up a data information sharing platform of the mental specialty alliance through information technology to realize the sharing of medical data resources within the alliance; to implement homogeneous management in the quality of the alliance to help grass-roots medical institutions improve their ability to prevent and treat diseases; to jointly enhance scientific research and academic research capabilities within the alliance; to open a two-way referral model to facilitate patients'referral encounters. Difficulties. Information technology mainly realizes: (1) clinical data sharing, including electronic medical records, LIS, PACS data reports, near-end and far-end viewing. (2) Systematic support for two-way referral and graded diagnosis and treatment of patients. (3) Unified medical quality management platform, implementation and supervision of medical policies, and quality control system of medical, nursing and sensory care departments. (4) Expert remote assistance consultation support system.

3. Current Situation Analysis

From the construction experience of regional platforms, in the process of establishing regional management system and operation rules, we mainly use medical informatization to bring into play the overall benefits of regional specialist alliances, improve the efficiency of division of labor and cooperation, integrate various clinical resources, and ensure the sustainable development of improving medical quality. At present, the problems encountered are that the information level

of hospitals in the mental specialty alliance is uneven, and the construction period, software manufacturers and functions of their respective systems are not uniform. This has resulted in poor information uniformity, low sharing efficiency and more useless data. There is a "data gap" among the units in the alliance. Objectively, the construction of information sharing platform for specialist alliances has caused some difficulties, which has affected the efficiency of medical resources sharing.

Internal hospitals within the alliance: Before the alliance, each hospital information system was independent and did not make a unified plan. There is no unified deployment of the various systems within the hospital, and there are also some problems such as information isolation and information islands among the systems. There is no interaction between data. The inconsistency of data structure standards and business processes between different systems also makes it more difficult to establish a specialized alliance platform.

Safety issues: At present, clinical resource sharing and business coordination are the main applications in the construction of the information platform of the Alliance of Specialized Hospitals. In the aspect of clinical data sharing, the security protection is the focus, especially the residents'electronic health records, electronic medical records, test data and other clinical data. As a psychiatric alliance, medical information is particularly important for ordinary patients. So privacy protection and information security are the key points in platform construction.

Effectiveness of information: The Alliance Information Platform for Specialized Hospitals is not only simple data storage and data sharing. In the process of platform construction, attention should be paid to the accuracy and relevance of data. The collected data should be cleaned preliminarily, data association should be done well, and data availability should be guaranteed. Prevent redundant data from being stored repeatedly and occupying server resources. Prevent the waste of hardware and software resources.

4. Systems Technical Scheme

Specialized hospital alliance information platform mainly uses China Telecom's hosted cloud servers. Hardware configuration can be flexibly configured according to business volume. Cloud computing servers support large concurrent business. Through cloud server cluster, personalized performance configuration is provided for hospitals in the alliance.

4.1 The architecture design of the platform is mainly service-oriented design. The system architecture is put forward in the guidance of the National Health Care Commission's Regional Health Information Platform Construction Scheme Based on Health Archives. The service-oriented architecture (SOA) is put forward, and the technical methods used by WEB service to implement the SOA architecture are introduced. SOA is a mode of designing platform architecture, which can distribute and combine application components through network according to the relaxation of loose coupling to platform. SOA is based on the service layer, which can be directly

invoked by applications to control the dependence of human control in software interaction.

4.2 There are many ways to integrate the system platform. At present, the mainstream integration standard of medical information industry platform is Web Services. The data format of Web Services is mainly XML, and HTTP protocol is the main protocol for data transmission. The advantage of this method is that the integration mode is simple, the security is high, and the intrusion is not strong, so the integration of existing multi-source systems is more effective.

4.3 Data processing and transmission system. It mainly runs on the data processing level and has nothing to do with the specific business. From the application point of view, it can be divided into routine operations such as data preparation, data transmission and data reception. Data transmission and reception and transmission are based on the data exchange platform side. Aim To realize the publication of applied data. There are two transmission modes, one is synchronous data transmission, and the other is asynchronous data transmission. In the transmission of these two modes, the data transmission system only makes operation calls, and the actual operation process is through the data interaction platform.
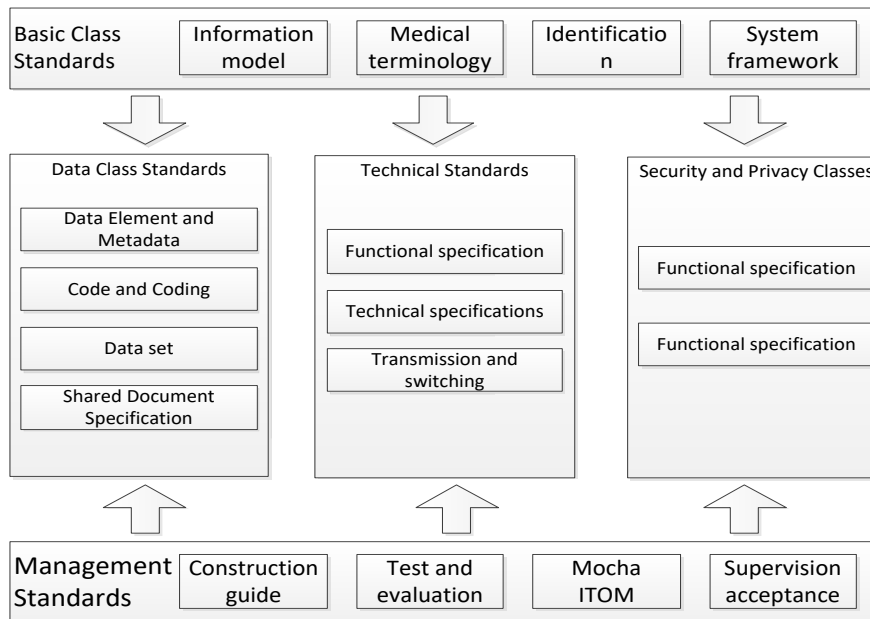

Figure. 1 Information Standard System of Mental Health Specialist Alliance
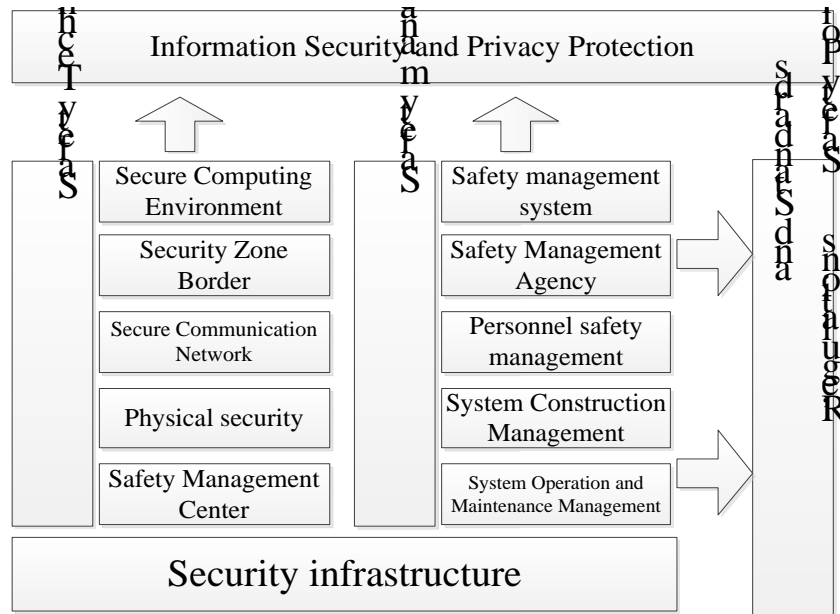
4.4 Security Design

Figure. 2 Schematic diagram of security design architecture

The spiritual alliance sharing platform uses the digital structure encrypted by 2048-bit SSL digital certificate to interconnect. To ensure the safe transmission of data. Psychiatric Alliance Sharing Platform also has the management authentication of login permission, so as to realize the data isolation between the alliances. The functions and powers of each login name are separated, and the unauthorized files and data can not be viewed. Thus, the security of the system is improved. At the physical level, the corresponding information security control has also been done. The server adopts the distributed cluster construction scheme, uses the cloud computer room, supports the dynamic allocation of resources, and ensures the high availability of resources.

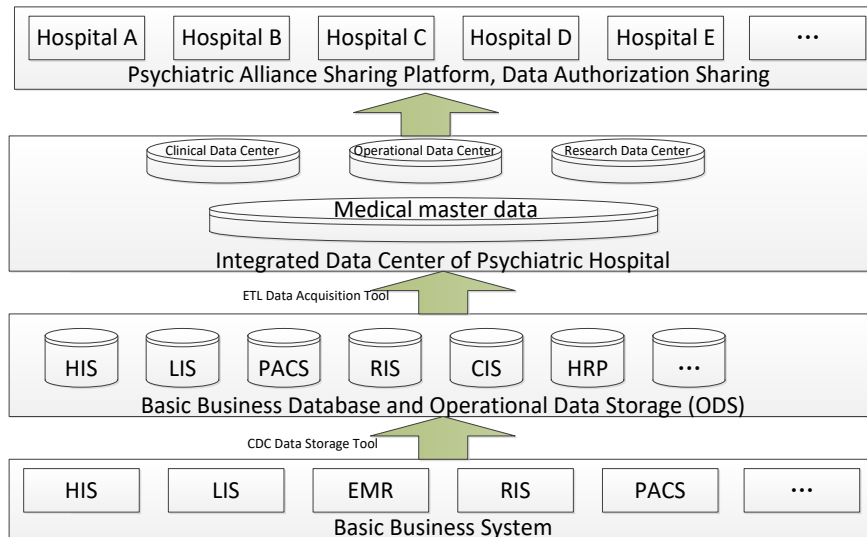## 5. Functional Realization of Psychiatric Alliance

Figure. 3 Psychiatric Medical Service Platform:

(1) In-alliance remote assistance module. Through the Internet and cloud computing platform, we can provide a variety of Internet remote services such as video consultation, remote joint ward rounds, remote joint teaching, multi-disciplinary consultation, image data sharing and so on. To make the alliance hospital cooperate with each other to break through the limitation of distance. It improves the efficiency of expert diagnosis and facilitates patients. Mainly using mobile interconnection technology, voice transmission, video technology to support the remote service platform.

(2) Two-way referral function. Two-way referral is a mode of graded diagnosis and treatment, and also the core link of cooperation between medical specialist alliances. In the sharing platform of psychiatry specialty, the alliance refers out the hospital to initiate referral and fill in the referral application form. The alliance platform actively excavates patients'basic information and diagnosis and treatment information and pushes it to the receiving unit. The receiving unit receives patients, and receives patients' medical information, electronic medical records, images and related diagnosis and treatment information. To achieve patient continuity. According to the agreement of the Psychiatric Alliance, the follow-up treatment of patients will be pushed to the original hospital, sharing the clinical experience after referral, and jointly improving the clinical level of the Psychiatric Alliance.

In summary, through the analysis and research of the multi-source system and heterogeneous system in the original alliance, and the shortcomings of single-

upstream mode of patients'medical treatment using regional platform at present, we re-construct the information sharing platform of psychiatric alliance with psychiatric alliance as the main body from the technical framework. Communicate the data of major mental health institutions in Suzhou, and consider the corresponding security and privacy precautions from the security aspect. Guided by the information sharing platform of the Mental Health Alliance, we can give full play to the advantages of mental health specialty, better implement graded diagnosis and treatment and meet the health needs of the masses, and promote the comprehensive and healthy development of mental health in Suzhou.

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