



## **Full Length Research Article**

### **RESEARCH ON A COMMUNITY MEDICAL HEALTH MANAGEMENT MODEL BASED ON "INTERNET+"**

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#### **ABSTRACT**

Aiming at the problems in current community health management such as substandard management, failure of real-time supervision and outdated technology in health management, this article proposes the "family + community + hospital" three-level health management model, and makes detailed introduction to the realization process. By utilizing technologies such as Internet of Things, cloud computing and big data, this model realizes the rapid, effect and continuous supervision and intelligent management to the physiological data of community residents, which provides great convenience for the health management of community residents to individual health, and improves the working efficiency and service quality of community health service center, and propels the construction of community health information system.

#### **INTRODUCTION**

Medical health is the critical part in our lives. Developed countries have rapid medical health development, high health management level and intelligent level on management system. For example, the close combination among medical service, computer and communication is highly emphasized in the U.S., and it improves the medical quality and working efficiency; besides, medical information resources sharing is conducted, and the continuity, integration and universality of information are taken as the center of the contents developed, and the computer network between hospitals and communities realize remote consultation and custody. The community health center in Australia pays attention to the construction of management, service and ability, and good transfer treatment system is established between the community health center and the hospital, to share the resources, which plays the role of general practitioner in community as a "gatekeeper". The medical informationization of China is always in continuous development and perfection process. At present, almost various levels of hospitals in our country have realizes his system coverage. However, the community medical health management construction just starts. According to the arrangement of domestic literatures, the researchers in our country propose many medical treatment and health management mode. Wang Juan et al suggest introducing

Internet of Things and body area Network into health management, to realize the network of intelligent acquisition, transfer and processing of information, to supervise and record the human health signals in long terms. It is necessary to conduct continuous supervision and recording of the health parameters of chronic patients, and conduct supervision to electronic health record, health supervision, activities, movement situations dosage and diet conditions of residents, and conduct management to drug and blood information. According to Du Xueli et al, it is necessary for community to change the idea, and improve awareness, and construct the dual transfer system between community health service center and general and specialist medical institutions in a up-down linked way, and construct the health management information platform. Ming Lanzhen et al propose the seamless type service concept on community health management medical service, to refine working flow, and realize "three-in-one" and "one station service", to realize ideal general medical service concept. At present, there are mainly the following problems in the community medical health management in our country: firstly, the community health management still takes disease as the center, without forming individual health evaluation and intervention system; secondly, in lack of the continuous supervision and management to the health indexes of chronic patients; finally, in lack of regional class information sharing platform for health management, and it has a high requirement on funds to establish such platforms; finally, in lack of the technology of storage, integration and data mining of health data of massive amount of residents.

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In 2015, the "Internet+" action plan was firstly proposed in the government work report by Prime Minister Li Keqiang. It is pointed in the government work report that: "Internet+" action plan will lay emphasis on the integrated innovation of new generation of information technology with representation of cloud computing, Internet of Things and big data and the modern manufacturing industry and producer services. Based on the proposal of "Internet+", the by combining the medical research field, the author discovers that: at present, the health management community in our country mainly establishes individual health document to conduct intervention to four main chronic diseases and children's preventive vaccination, and the proportion for the senior citizens over 60 years' old of using intelligent terminal is relatively low, and many of them cannot use it, and children cannot conduct self management. Therefore, the author takes family as the minimum management unit, to propose a brand new "family + community + hospital" three-level integrated intelligent and healthy management model, to utilize wireless sensor, cloud computing and big data platform technologies, to conduct reform to community health management service mode by taking family as the main units, for the purpose of optimizing management, reducing cost and improving residents health management level.

## Main Technologies

### Cloud Computing

Cloud Computing is the product of integration of traditional computers including Distributed Computing, Parallel Computing, Utility Computing, Network Storage Technologies, Virtualization, Load Balance and High Available and network technology development.

**Wikipedia:** Cloud Computing is a kind of Internet-based computing mode, and resources and information sharing can be provided to computer and other equipment hardware by adopting this computing mode. It describes a Internet-based new service mode, which generally provides dynamic and easy extended virtual resources by Internet.

**According to the definition of National Institute of Standards and Technology (NIST):** Cloud Computing is a mode paying as per usage amount, which can provide available, convenient and as required network visit; after entering into configurable computing resource sharing pool (resources include network, server, storage and application software and service), these resources can be quickly provided and released, and it is only in need of little management work, or conduct little interaction with the service supplier. This cloud computing model improves the usability, with five basic features, three delivery modes and four deployment modes.

We can see from the above definition that cloud computing provides on-demand service for users based on the resource pool of the network; it can determine the size of the resources on-demand in a dynamic way, which realizes the sharing of information and resources.

**Big Data:** It is a data set with the size far beyond the traditional database software tool ability range on aspects of acquisition, storage, management and analysis, with four

characteristics of massive data scale, rapid data flow, diversified data types and low value density. The strategic significance of big data technology is not on the mastering of massive data information, but on the professional processing to the meaningful data. In other words, if the big data is assimilated to a industry, the key for the realization of profit of the industry is on the improvement of the "processing ability" to data, i.e., to realize "added value" of data by "processing".

Technically, the relationship between big data and cloud computing is just like the two sides of a coin, inseparable. It is inevitable to conduct big data with single computer, and distributed architecture must be adopted. It has the characteristic of conducting distributed data digging to massive data. However, it has to rely on the distributed processing, distributed database, cloud storage and virtualization technology of cloud computing.

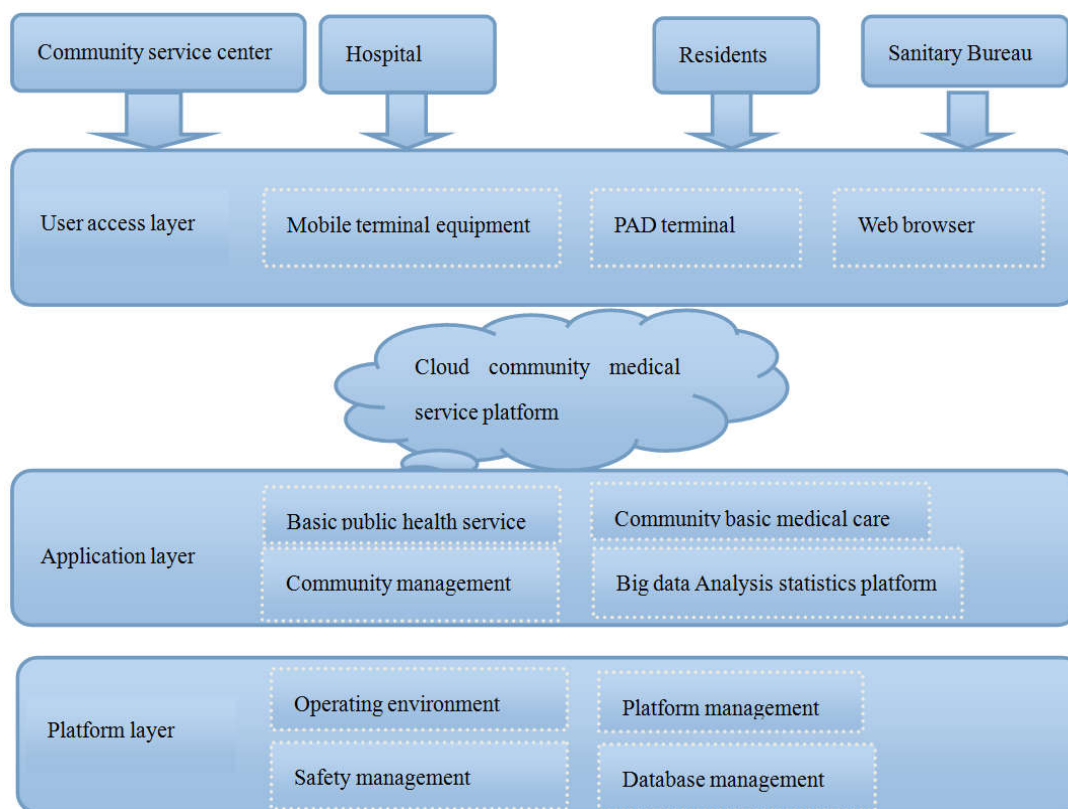
## Construction of Three-level Health Management Model

**Overall Architecture:** Take community residents as the object, to understand the current development status of chronic diseases health management service in communities of our country; investigate the health situation of local residents, and conduct discussion by combining the community medical service informationization construction, to summarize the problems existing in community health management service development, and establish community residents health management model. In combination of Internet of Thing, form individual regional wireless sensor network by medical sensor (sphygmomanometer, blood oxygen meter and electro cardio meter), and transmit the data to the community medical service center server by remote transmission module, and propose "family + community + hospital" health management module to conduct management to community residents. Please refer to Figure 1 for the overall architecture.

**Individual Mobile Terminal:** According to the health management requirements of community residents, individual health management mainly aims at conventional physical signs to conduct continuous supervision, to provide data support for the dynamic management of individual health records, and provides data support for the diagnosis of chronic diseases. Somatosensory system communicates with mobile device by wireless network or Zigbee network, and transmits the collected data to the mobile equipment in a real time way; after acquiring data, firstly, it conducts preliminary filtering and processing, to eliminate redundant information, and deliver the data to the cloud server in the community server center, for further analysis and processing. The individual client end of health management system adopts android system for software development; in order to reduce the data occupying mobile phone internal storage, the light SQLite database is adopted for the database, and Fragment component is utilized for page design, with more flexible arrangement for users to adjust at will.

## Purpose of Community Health Management

The community health managers mainly provide prevention service, medical service, family service, health service, health education and medical examination center



**Figure 1. Cloud Community Medical Treatment Service Platform Architecture Model**

Community health management is mainly accomplished by four steps: family health record, health examination, health information evaluation and health intervention. The family health record accomplishes the information collection to families, including: name, gender, age, marriage and medical history; health examination collects the health information of community residents within one or half a year including blood pressure, blood sugar and B ultrasound data, to provide data for the health evaluation in the next step. Health evaluation conducts medical diagnosis to the collected data, which is the core of health management. Health intervention includes emotion intervention, exercise guidance, disease prevention and chronic disease control. Community health management can improve the health level of groups by the following aspects: (1) it achieves the purpose of group health management by individual health management; (2) it formulates in advance and implements health service by simulating the health burden in the future; (3) it provides everyone with proper health intervention at proper time; (4) it makes the public gradually master their own health conditions by simulation.

## DISCUSSION

With the reform of medical system and the development of regional medical service informationization, the new generation of information technologies by utilizing Internet of Things, cloud computing and big data have become strategic emerging industries. By utilizing the health information collection and analysis development mode, this thesis proposes “family + community + hospital” three-level integrated intelligent management mode.

Firstly, utilize wireless sensors to realize the individual health information data collect at any time and any place, and utilize cloud computing and big data technology to provide low cost service platform for the quick inquiry and sharing of health information, and conduct continuous supervision and intelligent management to health index parameters by individual mobile terminal software. Community health management system can also conduct information feedback and health intervention timely, and provide abundant earlier stage health data for clinical diagnosis, and provide platform for the health prediction, disease control and intervention of regional medical information. This model can modify part of manual processes to automatic processes, and can promote standardized management, to improve business process efficiency. At the same time, by health management “preventive treatment of disease”, it can change adverse living habits and prevent in advance, to effectively reduce the prevalence rate of chronic diseases, to control medical service expense. It can even partly solve the problems of “difficulty of getting medical service and high cost of getting medical service”.

By utilizing regional medical health information service platform, it is available to realize the resource sharing of health record information of regional residents, the dual referral, medical image check, entrusted inspection and report transfer between regional institutions, to realize the real-time tracking of individual medical health service of residents. Health intervention service quality is one of the most important signs used to measure the resident health level in a region. Exploring the health tracking service from pregnancy and birth period health, birth of infant, child health and death during different medical institutions and providing quick and

humanized medical service by reserving medical service by utilizing mobile phone terminal can effectively improve the service quality of health intervention. It is necessary to construct a community resident health management system with unified index system, unified functional system and unified operational standard, to improve the management efficiency and quality of communication health management and business guiding institution, to provide community residents with more satisfactory medical health service.

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