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Enlightenment of NHS: Thoughts on the Optimization of China's Health Resource Allocation Structure

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***Abstract*—Health resource distribution structure should agree with the health care demands of common people, as allocating most resource to primary care institutions. However, China's healthcare resource layout is Inverted Triangle, with less resource to primary care institutions, more to hospitals, and it affects the efficiency of China's health care system. This article studies on the mechanism innovation of British National Health Service, especially the general practice system involving four parts, cultivation of General Practitioner, salary incentive system, principal-agent relationship, and first-contact and referral system, which helps to form optimized healthcare resource structure. It offers important instruction for us to optimize China's healthcare resource allocation by establishing a feasible and systematic general practice system at the primary care level. Based on it, this article proposes some suggestions of China health care reform.**

Key Words—healthcare resource distribution; primary care; general practice system

I. INTRODUCTION

Starfield and other scholars' study shows that if a country adopts a health care system based on primary care service, the health level of its residents is relatively high and the residents' satisfaction is relatively good, and the cost control of medical services is more satisfied. [1] Therefore, the state should focus on improving the status of primary care in the Health service system. The structure of people health demands also determines that the allocation of health resources among afferent institutions should focus on primary health service. Generally speaking, the healthcare demand of common people is a "Pyramid" structure, and the bottom of the Pyramid represents the medical treatment demands of common diseases, what the primary care entities are supposed to satisfy. "Common" refers to the universality and commonness of disease occurrence, with related to higher incidence, larger number of patients and greater medical demands. Moreover, the top of the triangle reflects the treatment needs of difficult and severe diseases and injuries, the incidence of difficult and severe cases is relatively low, when compared with common diseases, thus the medical treatment needs are relatively fewer. Therefore, people's healthcare service demands are always in a "pyramid" structure. Reasonably, the healthcare resource distribution corresponding to people's treatment demands should also be in a pyramid layout and allocate more health resources to the primary care service.

Otherwise, due to the information asymmetry phenomenon in the health service area, the patients as demanders of medical service are lack of medical expertise, unable to determine by themselves the type of diseases and which kind of medical institutions they should visit. In the non-emergency situation, the reasonable first step patients should take when they are ill is to see the physicians who have professional skills to determine basically the type of their diseases, and whether they need to go to secondary healthcare entities or not and which type of specialists they should go to see. That is what called general practice knowledge. Reasonably, general practitioners should be the first-visit doctors for patients, and as a result, the general practitioners as the first-visit for patients to get through the health care system should be allocated to the primary care institutions and close to the communities so to have common people easy to visit. Contribute to that, the service utilization rate of primary care institutions must be higher than that of secondary medical institutions considering almost all patients should go to the general practice institutions first before their utilizing specialists and big hospitals. Taking the utilization rate of medical services into account, the health care system should allocate most health resource to the primary health service.

However, some former studies have pointed out that the health resource allocation in China at present is in an inverted pyramid structure [2], and the distribution of resources such as the number of physicians and the health budget shows a pattern of neglecting primary care suppliers and emphasizing hospitals, furthermore, the resources are continuously enriching to big hospitals [3], which makes the health resource allocation increasingly unbalanced. The distorted structure of health resources distribution causes the shortage of primary care resources, the weak primary health service ability, and the failure to meet the health service needs of common people.

II. THE CURRENT CHINESE HEALTHCARE RESOURCE STRUCTURE

A. Personnel Allocation

In 2014, the total number of medical personnel in all kinds of healthcare institutions in China was 10.234 million, including 3.537 million in primary care institutions, and 5.742 million in hospitals (including primary, secondary and tertiary hospitals) [4], with a ratio of 6.2:3.8. It showed inverted Pyramid personnel structure. The number of general practitioners is 0.173 million, accounting for only 5.6% of the total number of physicians in China [5]. Compared with the number of general practitioners taking accounts for 30% ~ 60% of the total number of physicians among more than 50 countries and regions in the world, China's medical personnel layout in the hierarchical medical system is typical inverted pyramid.

B. Health Facilities Allocation

In terms of the growth rate of the number of healthcare institutions, from 2010 to 2014 the average annual growth rate of primary care institutions was 0.3%, and the average growth rate of hospitals was 4.7%. The growth rate of the number of hospitals was 16 times of primary care entities, showing its rapid expansion, especially the number of tertiary hospitals, with an annual growth rate of 10.4%, expanding most fast [6].

From 2009 to 2014, the number of hospital beds increased by 1.766 million in China, while the new beds in primary medical institutions only accounted for 13.8%. Although the hospital bed supply among the country was increasing, most of them were allocated to big hospitals. [7] Other health facilities are also being enriched to hospitals. At last, it attracted more patients to tertiary hospitals where healthcare resource are enriched, which makes hospitals expand their scale, and further promotes the enrichment of resources in big hospitals.

C. Health Expenditures

In 2013, the sum of health expenses spent in urban hospitals and county-level hospitals accounted for 53.74% of all the medical institutions, and the sum of health expenses spent in community health service centers, township hospitals and outpatient departments in primary care system accounted for 16.39%, the former was 3.3 times higher than the latter.[8]

D. Utilization Rate of Health Services

In 2014, the total Outpatient Volume of community health service centers and township health centers at primary medical level was 1.71 billion, accounting for 22.6% of the total outpatient volume of all medical institutions, which was 0.2% lower than the previous year. But when looking into the hospitals, the number of primary hospitals was 0.19 billion, the number of secondary hospitals was 1.15 billion, and the number of tertiary hospitals was 1.4 billion. Compared with 2013, the number of all levels of hospitals increased, and the growth rate of tertiary hospitals was the highest as 11.4%. [9] It showed that residents preferred to choose hospitals, especially big hospitals when utilizing outpatient services, which was contrary to the functional design of health institutions in graded medical system. Compared with Britain and the United States, most patients preferred to use primary care service first when they get ill, and 80% - 90% of patients were cured in primary care entities. [10]

In a word, China health resource allocation layout at present is in inverted pyramid structure, less resource distributed to primary healthcare service and more to secondary service. A large number of specialized medical resources are used in the first diagnosis and treatment of common diseases. The distorted health resources distribution structure resulted low efficiency of resource allocation in the medical system, weak primary health service, and harming the achievement of the goals "fairness" and "accessibility" in primary care supply system.

III. BRITISH PRACTICE AND ITS ENLIGHTENMENT

There are historical reasons for the distortion of healthcare resource distribution layout in China, for example, the continuous changes of national health policies from the planned economy period to the former medical reform and then to the new medical reform, and the various defects and imperfect institutional factors in the health service system as well. To rectify the distorted resource distribution structure, we need to reform and innovate the health service system. The experiences of building general practitioner system to guide the flow of health resources and optimize the allocation of health resources in the UK give us some enlightenment.

From 1948, the Britain state began to build a healthcare service system called National Health Service (NHS). NHS is divided into two levels, primary care and secondary care, which are provided by clinics and hospitals respectively. [11] Primary care service system is in the leading position of the NHS. First, the number of doctors in primary care institutions accounts for more than 50% of the total number of clinicians; secondly, the main suppliers of the primary care in the UK, general practitioners (GP) hold more than 60% of the NHS budget [12]; thirdly, the primary care institutions have achieved high service utilization rate and supply almost all the outpatient services in the UK. [13] The distribution structure of health resources in the UK is basically consistent with the triangle of medical needs of the population. Such a distribution makes the health service system in the UK achieve a lower cost when comparing with that in the United States or some other countries.

The key to the realization of a reasonable structure of health resource distribution in the UK is having built a general practitioner system at the primary care level of the medical system. The UK government guided the construction of general practitioner (GP) system in terms of institution and policies. In NHS, general practitioners (GPs) undertake most of the primary medical care services and become "gatekeepers" and "navigators" of health service system. The NHS was precisely through the construction of

the GP system to guide the flow of various healthcare resources to the grass-roots level, realizing the health resources layout with primary care as the focus. It mainly includes four aspects of system arrangement: GP training system, employment relationship and remuneration system, authorization of the general practitioner's agent identity, first diagnosis and referral system.

A. Training of General Practitioners

The UK has a systematic training model for GPs to ensure that each GP is well qualified medical staff with general practice knowledge and skills. In the UK, to become a GP, the medical student is supposed to go through "5+2+3" vocational training, including 5 years' medical undergraduate course, 2 years' clinical skill training after graduation, 3 years' normative training of general practitioner, and finally the examination and evaluation before becoming a GP. In addition, to ensure the skill improvement and knowledge innovation of GPs, further education should also be taken after they involve in their professional careers. [14][15]

At the meantime, great attention has also been paid to train GPs differently from specialist from the perspective of the functional orientations. Through strengthening the GP's knowledge and clinical training in general practice, GPs have the advantages to the specialists in providing the first diagnosis and supply the treatment of common diseases, as well as the continuous medical services for patients. Reasonably patients would spontaneously choose them as the first-visit medical staff when they get ill.

The British GP training system not only increases the number of GPs allocated to primary care service i the UK, but also improve GPs' skills and ability in first diagnosis and curing common diseases, so they win the trust of residents and naturally become the first-visit physicians for residents.

B. Employment Relationship and Remuneration System

1) Variety of employment relationships: Although the NHS is dominated by the government, and more than 90% of the hospitals are public in the UK, the state encourages GPs, the main providers of primary health services, to set up private clinics. Most of the GPs' clinics are private and self-sustaining entities or polyclinics. The DP clinics are responsible for their own profits and losses. A small number of GPs are employed by the state and assigned to clinics of NHS. They have a set working time in the NHS clinics, while they have the freedom to work part-time at the private clinics. [16] Although they are government employees, they have various choices of employment relationships, and can leave the NHS clinics and move freely as medical personnel resource.

The various employment relationships of GPs eliminates the flow barriers of health resources, and optimize the layout of medical personnel among medical entities. Moreover, the self-sustained employment model of GPs stimulates GPs to improve their service quality so as to gain competitive advantage in the primary care service market, which help to realize the improvement of primary health service quality among the country.

2) Salary motivation system: The remuneration system for GPs in the UK makes their income very competitive. The average salary of GPs is 3-4 times of the British average social salary [17], which is even slightly higher than that of specialists [18]. Different types of GPs have different remuneration systems. The employees who are directly employed by NHS receive a fixed salary from NHS and sometimes fluctuate up and down according to some specific indicators. While the self-employed GPs sign service contracts with NHS by clinic, and the public government purchases their health services. They earn the income from the combination of capitation, performance and fixed remuneration. [19] The income form capitation accounts for about 75% of the GP's income, performance income accounts for about 20%, and other service fees account for 5%.[20][21] The GP's remuneration system effectively encourages the excellent medical staffs to get into the primary health entities, as well as attracts more medical students to choose general practitioner as their lifetime career.

C. Agent Identity of General Practitioners

The authorization of the general GP's agent identity is one of the most significant institutional innovations in the British GP system. On the Thatcher government reform from 1991, by GP Fund Holder Program the GP had more freedom to "select referral hospitals on behalf of patients" [21]. In the Blair era, the primary care trust (PCT) was set up to allocate 3/4 of the NHS budget directly to PCTs, which was cooperated with GPs on behalf of residents to purchase medical services from hospitals [22]. In 2012, the new round of health care reform emphasized the GP's agent identity in further degree [23], by setting up 211 general practitioner associations (CCGs) operated by GPs themselves to replace PCTs. CCGs directly controlled more than 60% of NHS budget [24], responsible for purchasing services from medical service providers on behalf of patients. After several twists and turns, the British medical reform had established the GPs' agent identity, which was the fundamental part of the GP system. The GP finally obtained dual identities: on one hand, the provider of primary health services and the "gatekeeper" of the health service system; on the other hand, the agent on behalf of the patients taking responsible for purchase the medical services from the hospitals and specialists.

From the perspective of economics, such a system design involves at least two considerations. First, it made up for the defects of information asymmetry and improved the efficiency of healthcare resource allocation. There is information asymmetry between residents as buyers and hospitals as sellers, which reduces the effectiveness of health resource distribution. The mechanism assigning GPs with professional medical knowledge to be agents of residents could solve the problem of market failure caused by information asymmetry in favorable degree, and improve the efficiency of resource distribution in the medical service

market. Secondly, it helps to realize the cost control. Due to the lack of professional medical knowledge, patients were at a disadvantage position in the transaction. Hospitals had the tendency to provide unnecessary medical services so as to earn more income, it lead to the increase of the medical expenditure of the government and individuals. In the principal-agent relationship between residents and GPs, they became the common interest parties through the incentive and restraint mechanism. GPs used their professional knowledge to strive for the interests of patients and themselves by selecting suitable hospitals or specialists for patients in the referral process, and negotiating with hospitals to determine the necessary diagnosis and treatment projects for patients. It effectively prevents the hospitals from overtreatment and reducing the cost of health expenditure.

D. First Diagnosis and Referral System

The UK provides legal guarantee for first diagnosis mechanism, which stipulates that British citizens or foreign citizens holding more than six months' visas must register in a GP clinic. Around 1600 residents registered in one GP in the UK. [25] In non-emergency situations, residents must go to see a GP first when they were ill, who decides the follow-up treatment plan and whether the patient would be referred to the specialists or not. The UK has a strict referral system. Non-emergency patients have to go to the contracted GP first, and emergency inpatients also needed to go through the referral procedures at the contracted GP after hospitalization, otherwise they could not enjoy free services. [26] As a result, GPs undertook almost all outpatient services and play the gatekeeper part of the health care system in the UK.

Through the construction of the GP system, the UK has formed a health resource allocation layout with primary care as the focus so to match with the medical needs of the population. Its experiences are worthy of our attention and reference.

IV. CONCLUSION AND SUGGESTIONS

The practical experiences in the UK shows that the establishment of GP system at the primary level of health service system is a key measure to optimize the health resources distribution. In order to rectify the distorted structure of health resource allocation in China, it is necessary to build a feasible GP system according with Chinese actual conditions, which is also an essential step of medical system reform in China.

A. Establishment of a Systematic Training System for GPs

First, it is suggested to establish a standardized and systematic education and career training system for GPs as well as set up strict access threshold of general practice licensing. The general practice specialty should be energetically developed. A four-stage standardized training system can be established: 5-year medical undergraduate course, 1-year clinical basic skill training, 3-year normative training of general practitioner, and continuing education. After obtaining the licenses of general practitioner in the first three stages, it would be required that GPs have to receive further education, continuing to participate in academic training activities and updating professional knowledge.

Secondly, the GPs and specialists should receive differentiating training so to have differentiation advantages and play different roles in the medical system. In recent years, China GPs and specialists are in a homogenous competition. The differential training should be sped up so to qualify GPs to be first diagnosis physicians and provide the comprehensive and continuous health service to communities, so to make them the best providers of primary care service.

B. Reform of Employment Relationship and Institution Personnel Mechanism

The employment relationships in primary care service should be adjusted, and the coexistence of self-employment, joint operation and public employment can be encouraged. The first, the state can encourage GPs to run private clinics or polyclinics, and gradually increase the proportion of GPs' clinics in primary care entities until they become the main suppliers of primary care service. The physician who has obtained the license for general practice can be allowed to register for practice at multiple work places, as he may work full-time or part-time in public health institutions. Meanwhile, the state should introduce GPs into village clinics and urban community health service centers. The second, we should speed up the process of canceling the public institution personnel system, and break the "iron bowl".

C. Innovation of the Salary Motivation System and Health Insurance Payment System

At present, the income of GPs employed by the public institutions in China is not competitive. Some community health service centers sign up for family doctor services, but the medical staffs' salary has nothing to do with the number of contracted residents, such a remuneration system does not favorably reflect the inherent technical value and labor value of family doctors.

It is suggested to expand the sources of GPS' income, and reform the health insurance payment system. In addition to GPs' income from the public hygiene funds allocated by the state, it shall be connected with the primary care service paid by the medical insurance, covering the primary medical service supply for the contracted residents. The payment of medical insurance to GPs can be paid in advance by number of contracted residents. Each year, the prepayment amount of capitation to GPs is adjusted and determined with the total amount of the medical insurance fund income that year, and the prepayment should follow the individual resident flowing from one GP to another when they change their contracted doctor. The prepayment can be also adjusted considering the factors of local average income level, age, gender and other factors.

D. Establishment of the GP's Agent Status and Restraint Mechanism

First, it is suggested to authorize the GPs with the agent status for residents to purchase medical services by the prepayment system of capitation to GPs. However, it is also stipulated that after the diagnoses, if the GP transfers one patient to a secondary medical institution, he must pay a fixed transfer fee to the secondary institution. It encourages GPs to actively maintain the patients in the primary care system for treatment, which effectively help reducing the expenditure of medical expenses.

Secondly, the GPs' power as agents for residents should be restricted. In order to prevent GPs from keeping the patient from transferring to hospitals when it is necessary, it is essential that one resident has freedom to choose his GP and sign the service contract every year. This mechanism will urge GPs to actively maintain the health state of the residents and improve their service quality to satisfy residents' medical needs.

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