

**Establishment of Tiered Diagnosis and Treatment System Based  
on the Stakeholder Theory and its Strategies  
- A Case Study on Nanjing**

**WANG Chunming**

Thesis submitted as partial requirement for the conferral of the degree of  
**Doctor of Management**

Supervisor:

Prof. Pedro Fontes Falcão, Assistant Professor of Practice  
ISCTE University Institute of Lisbon

July, 2019

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## Declaration

I declare that this thesis does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any university and that to the best of my knowledge it does not contain any material previously published or written by another person except where due reference is made in the text.

Signed: 王春明 Date: 2019-6-11  
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姓名(拼音): WANG Chunming

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## Abstract

**Purpose:** This dissertation's purpose is to discuss the tiered diagnosis and treatment system and its implementation strategies in China based on the stakeholder theory.

**Method:** The thesis will take Nanjing as an example to compare the composition, management, and operation of the three major medical partnerships, namely, Jiangsu Province Hospital Group, Nanjing Drum Tower Hospital Group, and Zhongda Hospital Southeast University Group, based on the stakeholder theory and case analysis. Key stakeholders will be derived from the literature review, and the attribute of all stakeholders will be determined by Mitchell score-based approach. The thesis will also investigate cognition, recognition, interest demands and suggestions of core stakeholders concerning tiered diagnosis and treatment, and propose relevant suggestions to facilitate the implementation of tiered diagnosis and treatment.

**Results:** The three major medical associations in Nanjing are mainly established according to the model of "government appointment plus voluntary association". Their operation model and effects are different. Core stakeholders of tiered diagnosis and treatment include: health administrative departments, medical insurance departments, medical staff working at superior medical institutions, the public (patients, dependents of patients and residents), medical staff working at primary medical institutions, and companies; marginal stakeholders include center for disease control and prevention, new media such as WeChat official accounts and Microblog, administration for industry and commerce, medical staff working at private medical institutions, commercial insurance institutions, traditional media such as newspapers and TV channels; and general stakeholders include departments of finance, price departments, National Development and Reform Commission, Food and Drug Administration, public security organs, procuratorates and people's courts, and industrial associations. There are differences in the cognition, recognition, and interest demands among all key stakeholders.

**Conclusion:** The effect of the implementation of tiered diagnosis and treatment is not satisfactory. To further develop tiered diagnosis and treatment, more measures should be taken, such as publicity and guidance, proper resource allocation, introducing commercial capital, strengthening independent practices of medical personnel, and establishing sharing medical platform.

**Keywords:** tiered diagnosis and treatment; health; medical partnerships; stakeholders; Mitchell score-based table

**JEL:** I11; I18

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## Resumo

**Propósito:** O objetivo desta dissertação é discutir o sistema de diagnóstico e tratamento em níveis e as suas estratégias de implementação na China com base na teoria dos *stakeholders* (*partes interessadas*).

**Método:** A tese tomará Nanjing como um exemplo para comparar a composição, gestão e operação das três principais parcerias médicas, ou seja, o Grupo Hospitalar da Província de Jiangsu, o Nanjing Drum Tower Hospital Group e o Zhongda Hospital Southeast University Group, com base na teoria dos stakeholders e na análise de caso. As principais partes interessadas serão identificados com base na revisão bibliográfica e o atributo de todas as partes interessadas será determinado pela abordagem baseada no escore de Mitchell. A tese também investigará a cognição, o reconhecimento, as exigências de interesses e as sugestões dos principais interessados no diagnóstico e tratamento escalonados, e proporá sugestões relevantes para facilitar a implementação do diagnóstico e tratamento escalonados.

**Resultados:** As três principais associações médicas em Nanjing são estabelecidas principalmente de acordo com o modelo de “nomeação governamental mais associação voluntária”. O seu modelo de operação e efeitos são diferentes. As principais partes interessadas do diagnóstico e tratamento escalonado incluem: departamentos administrativos de saúde, departamentos de seguros de saúde, equipe médica trabalhando em instituições médicas superiores, o público (pacientes, dependentes de pacientes e residentes), equipe médica trabalhando em instituições médicas primárias e empresas; partes interessadas marginais incluem o centro para controle e prevenção de doenças, novos meios de comunicação como contas oficiais do WeChat e Microblog, administração para indústria e comércio, pessoal médico trabalhando em instituições médicas privadas, instituições de seguros comerciais, meios de comunicação tradicional como jornais e canais de televisão; e as partes interessadas em geral incluem departamentos de finanças, departamentos de preços, Comissão Nacional de Desenvolvimento e Reforma, Administração de Alimentos e Medicamentos, órgãos de segurança pública, procuradorias e tribunais do povo e associações industriais. Existem diferenças nas exigências de cognição, reconhecimento e interesse entre todos os principais interessados.

**Conclusão:** O efeito da implementação do diagnóstico e tratamento escalonado não é satisfatório. Para desenvolver ainda mais o diagnóstico e o tratamento escalonados, mais medidas devem ser tomadas, como publicidade e orientação, alocação adequada de recursos,

introdução de capital comercial, fortalecimento das práticas independentes de pessoal médico e estabelecimento de plataformas de partilha médica.

**Palavras-chave:** diagnóstico e tratamento escalonado; saúde; parcerias médicas; *stakeholders*; tabela baseada em escore de Mitchell

**JEL:** I11; I18

## 摘要

**目的：**运用利益相关者理论探讨中国分级诊疗体系及实施策略。

**方法：**基于利益相关者理论，运用案例分析法，以南京市为例比较江苏省人民医院集团、南京鼓楼医院集团、东南大学附属中大医院集团三大主要医联体的组成、管理、运营等，从文献复习法归纳出实施分级诊疗的主要利益相关者；运用米切尔评分法确定各利益相关者的属性；通过调查问卷法，考察核心利益相关者对分级诊疗实施的认知度、认可度和各自利益诉求及建议等，对分级诊疗实施提出相关建议。

**结果：**南京市的三大医联体主要按照“政府指定+自愿组合”的模式构建，具体运营模式、效果有所不同。分级诊疗核心利益相关者为卫生行政部门、医保部门、上级医疗机构工作人员、公众（患者、患者家属、居民）、基层医疗机构工作人员和企业；边际利益相关者为疾控中心，公众号、微博等新媒体，工商管理部門，民营医疗机构工作人员，商业保险机构，报纸、新闻等传统媒体；一般利益相关者为财政部门、物价部门、国家发改委、食品药品监督管理局、公检法部门和行业协会。各类核心利益相关者对分级诊疗的认知度、认可度及利益诉求存在差异。

**结论：**分级诊疗实施效果并不令人满意，需通过宣传引导、合理配置资源、引入商业资本、开放医务人员自由执业度、构建共享医疗平台等措施进一步推进分级诊疗。

**关键词：**分级诊疗；健康；医联体；利益相关者；米切尔评分表

**JEL:** I11; I18

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## Acknowledgments

Time flies, my doctoral study career is nearing the end. Firstly, I would like to express my gratitude to the Doctoral Program of Management in Healthcare, which is supported by the joint cooperation between Southern Medical University and ISCTE-IUL. The program enabled me to have the opportunity to study in a world-class university.

Secondly, I would also like to express my gratitude to ISCTE-IUL for enabling me to learn advanced public health policies and management experience in the world. Moreover, my heartfelt thanks will be given to my supervisor Professor Pedro Fontes Falcão. Thank you for your tireless teaching and your patience in answering my questions.

Then, I would like to thank Professor Virginia Trigo, Professor Nelson Antonio, Professor Sandro Mendonca and Professor Jose Esperanca, Professor Jiang Hong, Professor Lin Rupeng and Professor Xia Weidong for their guidance during my learning journey, shaping my research direction and helping me to refine my research in time. Last but not least, I would like to sincerely thank Dean Wang Dong, Eva Xu and Vian Ou from the program for giving me help and encouragement during my thesis writing. Finally, I would like to thank my family and friends for their understandings and supports during my doctoral journey.

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## 致谢

时光荏苒，转眼间博士研究生学习生涯接近尾声，我要感谢南方医科大学提供与 ISCTE-IUL 合作开办的公共卫生政策与管理博士学位项目,让我有机会到世界一流的高等学府学习交流，感谢 ISCTE-IUL 让我能够学习到世界先进的公共卫生政策及管理理念。衷心地感谢我的指导老师 Pedro Fontes Falcão 教授，感谢对我孜孜不倦的教导，不厌其烦地为我答疑解惑。感谢葡方 Virginia Trigo 教授、Nelson Antonio 教授、Sandro Mendonca 教授、Jose Esperanca 教授、Paulo Bento 教授、Alvaro Rosa 教授等，以及中方姜虹教授、林如鹏教授、夏卫东教授等各位老师对我的指导，为我指正了研究方向，更新了我的管理理念，让我及时改正研究的不足。感谢王冬院长、公共卫生政策与管理博士学位项目组许睿敏老师、欧玮艳老师等对我论文写作的关心、帮助和鼓励。在此，我要感谢我的家人对我博士学习的理解和支持，感谢所有关心我的朋友们。

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## Chapter 1: Introduction

The World Health Organization (2000) maintained that more than 80% of the health problems of residents can be solved at the grassroots medical institutions. However, the grassroots medical institution consultation rate in China lags far behind the world-recognized level. China started a new round of health care reform in 2009. Aimed at “guaranteeing basic medical services”, “strengthening grassroots diagnosis and treatment” and “establishing a complete system”, the government has adopted a series of measures such as strengthening the training of general practitioners, offering medical support to rural residents and sending a thousand doctors to the rural area to improve the comprehensive medical service capacity in the grassroots level. Yet problems like low efficiency and enthusiasm to share quality medical resources of large medical institutions to grassroots level ones. In this round of health care reform, the government stressed for the first time to promote tiered diagnosis and treatment system to make general diagnosis and treatment accessible in the grassroots medical institutions. Tiered diagnosis and treatment refers to classification of diseases according to the acuteness, severity and difficulty and medical institutions at different levels should be responsible for treatment of designated level of diseases so that medical institutions of different levels can make the best of their strengths, form a reasonable treatment order and establish connections among themselves.

In response, there have been several explorations on how to practice tiered diagnosis and treatment system around China. However, up till now, the results have still been unsatisfactory. The idea has been well recognized but seldom put into practice. The grassroots initial diagnosis exists in name only, and the implementation of tiered diagnosis and treatment system has entered a difficult phase, with five key problems.

Firstly, medical resources are distributed in an inverted triangle manner with severe shortage of resources at the grassroots level. In accordance with the world-recognized international practice, the normal medical order should be a “top-down triangle”, namely 70% of the common diseases should be diagnosed and treated in the grassroots medical institutions, 20% of the acute illnesses in the secondary and tertiary hospitals, while only less than 10% of the difficult and complicated cases be handled in top hospitals (Ji, 2000). Although there are regional health care development planning and medical institution establishment planning at all

levels from the country to township, the medical resource distribution is still an inverted triangle. Geographically, medical resources are still concentrated in developed areas and urban areas. From the perspective of medical institutions, the medical personnel in grassroots medical institutions are not enthusiastic about initial diagnosis. In recent years, the government has increased investment on grassroots basic public health service programs and strengthened assessment on its implementation effects. As a result, the grassroots medical institutions put more energy on public health and neglect medical services. The deterioration of medical service capacity of these grassroots medical institutions makes it difficult for the general public to seek treatment at the nearest medical institution. After drug sale with no markup was implemented, the price of medical service has not been adjusted accordingly, which severely dampened enthusiasm of the medical staff. They lack the initiative for initial diagnosis and in order to avoid medical risks, they tend to evade responsibility and refer patients to higher-level medical institutions. Large hospitals have abundant and high-quality medical resources and are much more competitive in work environment, salary, and promotion, but most medical resources are used in common diseases. Driven by profit-seeking, many large hospitals have been expanding blindly in recent years with higher outpatient building, and increasing amount of hospital beds and large medical equipment. Apart from syphonage of patients, these large hospitals also poach outstanding medical staff from the grassroots medical institutions. As for the grassroots medical institutions, the hardware has been significantly improved due to policy support, but the soft power is still a short plate. There are lack general practitioners and the educational background of the medical staff is relatively low. The salary and occupational promotion in grassroots medical institutions is far behind that in secondary and tertiary hospitals. Talents are seldom retained in grassroots hospitals, and many medical school graduates only regard the grassroots hospital as a transition and take every chance to transfer to larger hospitals.

Secondly, doctor enthusiasm and external recognition of grassroots initial diagnosis are both low, leading to treatment disorder. On the one hand, with the improvement of income levels and life expectancy, people become more concerned with health. However, they do not have sufficient knowledge on disease and do not trust medical institutions. Instead, they tend to visit large tertiary hospitals, leading to “difficult access to and disorderly health care service”. On the other hand, medical staff at the grassroots level lacks the initiative for initial diagnosis. The government has increased investment on basic public health service programs, but the assessment on grassroots medical institutions has also been strengthened, and requirements on them have also been enhanced. However, the income of the medical staff is not improved

significantly. As a result, in order to avoid risks, many of them become a “signatory” and indiscriminately refer patients to larger hospitals.

Thirdly, the referral mechanism is imperfect as bottom-up referral is easy and top-down hard. The so-called dual referral is actually one way as it is easy to be referred to higher-level hospitals and difficult in the other way. An interest-sharing system has not been established in the “dual referral”, as grassroots hospitals and higher-level hospitals are competitors to each other. On the one hand, in order to safeguard their own interests, large hospitals are unwilling to refer patients to lower level hospitals. On the other hand, grassroots hospitals tend to avoid trouble whenever possible. In addition, considering their own health, patients are also unwilling to be referred to grassroots hospitals if they can stay in large hospitals. The coordination institution responsible for dual referral is unsound and information is not fully shared.

Fourthly, patients with acute diseases have no access to large hospitals and those with chronic diseases cannot be referred. For a long time, the comprehensive utilization rate of medical resources in large hospitals is low and grassroots medical resources are severely wasted. Tertiary hospitals are crowded with convalescent patients and chronic disease patients who have been diagnosed with stable condition. These two types of patients occupy beds for a long time and are seldom referred in time to grassroots medical institutions. As a result, patients with acute and critical diseases have no access to the quality resources of tertiary hospitals. There are two reasons. First, medical institutions of all levels and types do not have an accurate positioning of their functions, lacking a scientific and reasonable collaboration mechanism. The medical resources in grassroots hospitals are insufficient and most are wasted. Second, there are no substantial policy measures and effective supervision and assessment measures to promote tiered diagnosis and treatment.

Lastly, collaboration between grassroots hospitals and higher-level hospitals are problematic. Promotion of tiered diagnosis and treatment needs collaboration among many government departments, but currently the role is mainly played by the National Health and Family Planning Commission of the PRC. There is no department that can coordinate with other departments and issue policy measures (Wen & Fang, 2015). In addition, collaboration between high and low level of administrative departments is problematic, with nobody responsible for it. There are also some medical partnerships established, but most are the loosely-connected ones. Some higher-level hospitals take the advantage to plunder resources from grassroots hospitals.

As the capital of Jiangsu Province, Nanjing enjoys abundant medical resources. The

medical institutions within Nanjing are in different levels and under jurisdiction of different departments. Apart from offering health care service to Nanjing citizens, the hospitals also serve patients from the whole province, neighboring provinces and even the whole country. Tiered diagnosis and treatment has been implemented in Nanjing for several years and Nanjing is among the earliest cities to establish medical partnership in China, but the results are not satisfactory. Problems encountered by Nanjing in promoting tiered diagnosis and treatment are similar to those of other capital cities, and are an epitome of implementation of tiered diagnosis and treatment around China. With Nanjing as the case and based on the Stakeholder Theory, the author takes the perspective of “current situation → problem → measures” and adopts methods of literature review, questionnaire, case study, and in-depth interview to analyze the tiered diagnosis and treatment system and propose corresponding measures so as to serve as a reference for other places.

The thesis is organized as follows: After this Introduction, the literature review is presented, followed by the Research Background and Methodology. The Results are then shown and discussed, ending up with the Conclusions and References.

## **Chapter 2: Literature Review**

The Literature Review will cover the Representative Tiered Diagnosis and Treatment Model outside China, the current Tiered Diagnosis and Treatment Model in China, followed by the Stakeholder Theory.

### **2.1 Representative tiered diagnosis and treatment model outside China**

The author has selected the most relevant systems including the systems from the UK, the USA, Japan, Singapore and India.

#### **2.1.1 The “Gatekeeper” system in UK**

The UK is a model in establishing the community doctor “gatekeeper” system as the National Health Service (NHS) adopted by the UK is famous around the world for its wide coverage and low cost. The health care in the UK is divided into three levels. Primary Care accounts for the majority in the NHS System and is mainly offered by general clinics and general practitioners, and the major form is outpatient service. The services cover treatment of common diseases, health publicity, social precaution, family care and some special health care service such as drug or alcohol rehabilitation. General practitioners act as a “gatekeeper” in the NHS system, as 90% of patients receive diagnosis and treatment in grassroots health care service system with no need to be referred to secondary institutions. Secondary health care service is offered by hospitals. Doctors get the knowledge of patient’s medical record from the referral letter of the general practitioner. If specialized doctors meet across patients with acute or critical diseases, they will resort to experts in this domain for help, and that is tertiary health care service. The tertiary health care service in UK refers to an expert service used in a clinical specialty to resolve special, difficult and complicated issues (Pan, 2004). There are three levels of departments in the NHS administration system. Department of Health (DH) is responsible for policy making and is in charge of 10 regional Strategic Health Authorities (SHA). DH establishes all kinds of standards and allocates fund and central government budget to Primary Care Trust. SHA is responsible for management of all types of NHS trust organizations. There are trust organizations under the jurisdiction of SHA responsible for service offering and operation of local NHS. These trust organizations are mainly Primary Care Trust (PCT) and

hospital trust organizations (Shanghai Health Bureau, 2012).

NHS started in 1948. The government merged or acquired most medical institutions. Hospitals are run by the country, the medical staff are paid by the country, and the UK began to implement National Health Service system. In 1964, the UK announced to offer free medical service and British citizens only need to pay registration fee to get treatment. The national health fund comes from three sources: 85% is offered by national budget, 10% comes from tax paid by entrepreneurs and employees and the rest 5% comes from other charges (registration fees and dental fees) (Chu, 1985). In this system, doctors' salary is not linked with workload, so doctors are slack in work and patients have to wait for a long period of time to get treatment. NHS developed rapidly in the 1960s and 1970s with a scientific medical service framework taking shape and a modern NHS pattern established. In the late 1970s, the British government focused on improving the operation efficiency of NHS. In the late 1990s, the British government formed public hospitals into hospital trust with independent legal person status. There were 450 hospital trusts established in total from 1991 to 1998 (Mao & Yao, 2005; Tu & Wu, 2015). Since 2010, the Cameron Government initiated a new round of health care reform and introduced competition in the "internal market" of general practitioners. In this patient-centered system, the public can freely select general practitioners. In March 2012, the UK government passed the new medical reform bill *Health and Social Security Bill*, which introduces competition from three aspects. First, non-government associations become the core of NHS operation. Doctor trust management unions are established and they are non-profit statutory public groups. Second, the central government delegates administration of NHS to local government departments. Third, efforts are made to strengthen competition among medical institutions (Gao, 2016). All the NHS hospitals have become foundation trust institutions and they compete with each other to win contracts from the doctor trust management union. Private hospitals are also encouraged to compete with NHS.

As the "gatekeeper" of NHS, general practitioners have a high market entry threshold, normative management institution and well-paid salary. The community initial diagnosis is enforced by law. British citizens or foreign nationals with over six-month visa can sign contract with family doctors. For non-emergency situations, patients must get initial diagnosis by general practitioners who will decide the following therapeutic schedule. The British government further standardized general practitioner initial diagnosis system through third party PCT "purchase service". Three quarters of NHS budget are allocated directly to third-party organizations, which purchase medical service from community health center and

hospitals (Wilkin, 2002). The fund is allocated according to headcounts. The third-party organization can keep the income surplus without affecting the fund allocation of the next year, but the income surplus must be used to upgrade equipment and improve medical service quality. Since the budget is fixed, the third-party organizations focus more on preventive services and health education so as to reduce unnecessary cost (Giaino, 2002).

The major advantages of NHS are low investment, high fairness, wide coverage, and efficient use of medical resources. However, with the passage of time, it also exposed such problems as insufficient financing, long waiting time for hospital appointment, delay in illness and obsolete hospital facilities.

### **2.1.2 The US**

The medical system of the US is unique in developed countries as it is mainly regulated by market while government plays an insignificant role. The medical system in the US has two levels. The first level is made up of family doctors and the second is made up of all types of hospitals (MacReady, 2008; Gu & Li, 2009). Hospitals in the US can be divided into government hospitals, private non-profit hospitals and private profit-making hospitals, accounting for respectively 27%, 62% and 11% (Xu & Li, 2005). Most private hospitals are non-profit and established by individual donation to serve the community. Public hospitals mainly serve particular groups such as the army, the veteran, the psychopath and patients with infectious disease, while private hospitals serve all the people. Although they are not large in size, they often can offer better medical service. Individually practicing family doctors offer primary diagnosis and treatment service while higher level of diagnosis and treatment is in the charge of specialist doctors (MacReady, 2008). Patients will first visit family doctors who will decide whether the patient will be referred to specialist doctors. This kind of referral is not realized by administrative decree but by medical insurance system and normative operation standards.

The US medical insurance system is made up of public medical insurance and private medical insurance. The public medical insurance is funded by the government and the private medical insurance is offered by commercial insurance company and purchased by employers or individuals (Xiang, 2012). The medical insurance fund is composed by three parts: the government, the enterprise and individuals. The private medical insurance is very developed in the US, which is very different from the situation in other developed countries. In the US medical insurance system, public medical insurance only covers particular groups of people

and it is the private medical insurance that plays the significant role. The current public medical insurance system in the US is made up of Medicare, Medicaid and SCHIP (the supplemental bare bones insurance offered to uninsured kids) in different states. These programs are targeted at the elderly, the disabled, the medium and low-income groups and kids in poor families. Apart from the three insurance programs, there are other medical insurance programs targeted at particular groups, including Federal Employees Health Benefits Program (FEHBP), TRICARE, Veteran Health Administration (VHA) and Indian Health Service (HIS) (Xiang, 2012). The private medical system offers more types of medical insurance with wider coverage, but its premium is also higher.

The core of Obamacare is to decrease health care expenditure and expand medical insurance coverage (Liu, 2010). This medical reform has ended the stagnation of medical security in the US. But Trump abolished Obama's health reform policy after he took office. The US health system will continue to face the challenges of rising medical costs for a long time.

### **2.1.3 Three level medical circle in Japan**

With relatively high per capita income, Japan has a relatively perfect medical insurance system. The medical service in Japan is offered by three level medical circles. The first level is in municipalities, towns and villages and offers outpatient service to residents. The second level mainly offers in-patient service and is established according to population density, traffic condition, social and economic development and patient inflow and outflow. The third level is in prefectures and mainly offers advanced inpatient service without outpatient service (except referral) (Wei & Li, 2016).

There are mainly three types of medical institutions in Japan: hospitals, general clinics and dental clinics. According to the ownership, level and function, they can be divided into functional hospitals, regional medical support hospitals, tuberculosis hospital, mental hospital, and small and medium hospitals. The particular functional hospitals are designed to offer sophisticated, precise and advanced medical service as well as introduction, development and assessment of advanced medical skills. The functions of regional medical support hospitals are four centers: tiered diagnosis and treatment center, medical center, emergency center and education and training center. In addition, there are also specialized hospitals (Liu, 2016).

Japan is among the earliest developed countries to establish a universally covered national health insurance system. Since 1961, all citizens must be included in any form of medical insurance (Gong, 2012). There are four types of medical insurance in Japan. The first type is



for employees of enterprises or groups, including life insurance managed by the government, portfolio health insurance of mutual aid organization, crew insurance, and civil servant insurance. The second type is targeted at the self-employed, peasants, and retired. The third type is old-age insurance for old people over 70 or those sick in bed over 65. The fourth type is for the retired but whose age does not meet the threshold (Luo & Wang, 2009).

Similar to the United States, there is also a problem of rising medical costs in Japan. With the aging of population and continuous economic downturn, the government investment in health care is not optimistic. The fairness of medical insurance in Japan also deserves attention. The national health insurance in which farmers and low-income people mainly participate is weak.

#### **2.1.4 Medical service system in Singapore**

Singapore has a complementary public and private medical service system with a clear division of labor. Private hospitals, private practitioner, public hospitals and polyclinics offer primary health care, while public hospitals offer inpatient service (Xin, 2008). Singapore also implements a strict dual referral system. Patients get initial diagnosis in community hospitals. If the community hospitals are incapable, patients will be referred to large general hospitals and to get treatment in public hospitals, patients must be referred by polyclinics. As mentioned before, the public medical service system in Singapore is composed of public hospitals and polyclinics, and the private medical service system is composed of private hospitals and private practitioners. The public medical institutions include national public hospitals, six specialized treatment center and 16 polyclinics, while private medical institutions include 13 private hospitals and over 1,900 private clinics. Private clinics shoulder 80% of primary health care and public hospitals shoulder 80% of inpatient service (Xu & Li, 2005). The success of the healthcare system in Singapore is largely attributable to the Central Provident, which includes the Mediasave, the MediShield for serious and chronic illness as well as long-term care, the Medifund that pays the medial treatment for the poor. Moreover, the family members can share the benefits and costs of Medisave to jointly resist risks (Haseltine, 2013). In addition, the public feel free to purchase private commercial insurances, such as i-MediCare and ElderShield.

The medical marketization in Singapore manifests a highly calibrated capitalist market economy in which the government may intervene in, correct or guide the market, as evidenced by the government's funding of public medical institutions while encouraging the development of private hospitals and clinics (Haseltine, 2013). The quality of medical technology and

services in Singapore are very satisfactory, but people in Singapore are also confronted with the problem of rising medical burdens. Efforts shall still be demanded to expand the coverage of medical insurance and reduce the cost of medical care. In addition, the long waiting time for patients in clinics and general hospitals is also an urgent problem to be solved.

### **2.1.5 Three level medical service system of India**

India relies on the low-level medical service system to meet the medical service needs of low-income population. The Indian government has established a universal three-level medical service system, with over 60% being public medical institutions. The government offers 90% of the operation fund of public hospitals. The hospitals offer free medical service to the poor. There are 150,000 primary health care institutions offering primary prevention and general outpatient service. There are 7,500 secondary health care institutions offering simple inpatient medical service. There are 120 tertiary medical institutions mainly offering expert-level inpatient medical service to the rich. In addition, there are 45,000 private medical institutions in India (Ge, 2009). Most Indians live in the rural area. Since the 1980s, the Indian government started to establish three-level health care network in the rural area, including health station, primary health center and community health center, offering free medical service to low income groups. After 1996, the government issued planning of community medical center, building one community medical center for every 100,000 rural residents. The medical center usually has four doctors, about 30 beds, lab, and X-ray equipment. Patients that cannot be treated in community health centers will be referred to regional hospitals with better medical conditions. This architectural design has covered needs of all groups and the free medical service has greatly relieved the financial burden of many poor families, which also ensures social equity (Chen, 2008). The Indian government allows development of private medical institutions and encourages them to cut down medical fees for poor patients.

Although India is not richer than the developed countries, the government still implements a free medical care system for all the public and has established a sound medical service system. As private medical institutions provide high-level medical services, their medical expenses are higher than those in public medical institutions, but they are still not high when measured by the general international standards.

### **2.1.6 Conclusions**

In summary, the health care system in various countries is worth of reference by China

from many perspectives in spite of some shortcomings. Although the health care system in UK is also confronted with many problems, its “gatekeeper” system with general practitioners as its core is still worth our reference. The family doctor signing system has been fully implemented in China at the grassroots level. At present, the general practitioners are in great shortage, however, the cultivation of medical students cannot be accomplished overnight. Although the specialist physicians are encouraged to transfer to general practitioners in China, such encouragement is not effective as expected. In addition, on the one hand, China may refer to the policy on introduction of medical talents in U.S.; on the other hand, it can refer to the experience in India of cultivating experienced nurses to be general practitioners. China also has to learn the social work system implemented in developed countries and develops a sound training, management and supervision mechanism to encourage ordinary people to actively participate in ordinary nursing work and alleviate medical pressure. The developed and abundant medical insurance system highlighting mutual supplementation between public and private medical insurance in the United States as well as its well-established diagnosis and treatment regulations and operation codes are worth our reference, but the basic medical treatment of medium and low-income people in the United States, especially those low-income people, is difficult to be guaranteed. With the application of new medical treatment technologies and new methods in U. S., the medical expenses are continuously rising, which has brought about heavy economic burdens to the people. Thus the restrictions of hospital budgets and the control of doctor charges need to be further strengthened in U. S.. In China, the basic medical insurance system covers a wide range of area and has guaranteed the basic medical needs of the masses. The medical insurance for serious illnesses is an important guarantee to prevent the masses from returning to poverty or becoming poor due to illness. However, the primary medical care shall be further enhanced in China to fill the medical gap; in addition, perfect regulations on diagnosis and treatment shall be established to further liberate the freedom of doctors, increase the role of market in the allocation of medical resources and accelerate the development of commercial insurance. The three-level medical circle in Japan highlights definite functions and smooth connection up and down. Although great efforts have been devoted to vigorously promoting the tiered diagnosis and treatment in China, the implementation effect is not as satisfactory as expected. In terms of policy, the “tiered” implementation by the Chinese government is to fix and divert patients based on different functions of the medical institutions, release medical resources and ease the pressure of medical treatment; however, the “tiered allocation” rooted in the minds of ordinary Chinese people and medical institutions refers to the division of “Grade I, II and III” or “Grade A or B” of medical

institutions. As a result, the promotion of tiered diagnosis and treatment in China demands further policy publicity and breakthrough of the ideological barriers rather than enabling the government to play the "one-man show" in the tiered diagnosis and treatment. The mode of medical insurance payment by DPC/PDPS in Japan is also worth our reference. The term of medical insurance payment in China needs to gradually shift from project-based charges to sickness-based charges, per capita fees, scale prepayment and payment by disease diagnosis-related grouping, etc. As Singapore features a superior health care system that could provide affordable and quality medical services to the public, China once studied Singapore's Medisave idea and piloted it in Shanghai, but it ended in failure mainly due to a shortage of adequate safety network, alternative medical insurance and the basic conditions for implementing Medisave in Shanghai (Dong, 2006). If China wants to implement a medical policy similar to Medisave, it has to further improve relevant supporting policies on population, employment, urbanization and immigration etc. With the increase in the proportion of the elderly population, the Singapore government has felt significantly increased pressure in its investment in medical treatment, but the government still insists on investing more financial support for the elderly. The Singapore Medical Fund has established a specific care fund for the elderly; in addition, a specific youth medical fund is set for young people under 18 years who are suffering from diseases and difficulties in life. In this sense, China is also confronted with an aging population, but the medical fund is less differentiated for young people and the elderly. Thus the rational allocation of medical insurance funds needs to be further strengthened. As a neighboring country of China, India has many similarities with China, and it is not even as good as China in terms of income and living conditions. The high-quality and high-end medical resources in India are mainly concentrated in private medical institutions while public medical institutions feature poor medical conditions for its non-profitable purposes. Patients with better economic conditions are naturally diverted to private medical institutions to ease the pressure on medical treatment in public medical institutions. Moreover, the Indian government has been vigorously supporting the development of its private medical institutions by granting convenience to them so as to encourage them to share social responsibilities. In contrast, China's quality medical resources are mainly concentrated in public hospitals, especially in the Level-III public hospitals; and there's super hospitals with more than 10,000 beds. For the private hospitals, they have been confronted with difficulties when they were set up at the very beginning. Although the central government encourages the development of private hospitals, in the process of grass-roots implementation, private medical institutions are still obstructed by many parties. What's more important is that Chinese hospitals, private or public, are essentially "profit-seeking

commercial organizations”, which has thus led to the prevalence of excessive medical treatment, excessive consumption of medical insurance capital and increasingly rising medical expenses. Therefore, the development of tiered diagnosis and treatment still has a long way to go in China.

## **2.2 The current tiered diagnosis and treatment model in China**

In order to describe the current tiered diagnosis and treatment model in China, we will describe the concept of medical partnership, present the County Medical Service Community of Tianchang, and describe the Specialized Medical Partnership concept.

### **2.2.1 Medical partnership**

The concept of medical partnership has been put forward for 20 years and its goal is to make medical resources accessible in the grassroots level, establish ordered treatment order, improve utilization rate of medical resources, and offer accessible and inexpensive medical services to the general public.

Premier Li Keqiang stressed again in the *Report on the Work of the Government* in the Fifth Session of the Twelfth National People’s Congress that it is imperative to establish medical partnership. We will launch nationwide trials to establish partnerships of different forms between medical institutions operating at different levels. All municipal-level public hospitals will be expected to participate and play a leading role in this initiative. We will establish performance evaluation and incentive mechanisms that encourage the coordinated use of quality medical resources with a view to improving the capacity of community hospitals and convincing people by enabling access to medical services closer to home. We will extend trials to use a tiered diagnosis and treatment model and a contracted family doctor service system to cover over 85 percent of prefectural-level cities in China (the State Council, 2017). Medical partnerships should be led by tertiary hospitals and co-established by specialized hospitals, secondary hospitals and grassroots medical institutions so that quality medical resources are accessible in the grassroots level, see Figure 2-1. According to asset formation, medical partnerships can be divided into (1) tightly-knit ones, (2) semi-tightly-knit ones and (3) loosely-knit ones.

For each one, we will present a brief description, followed by a) basic information, b) management system, c) operation mechanism, and d) results.

(1) Asset-integration tightly-knit medical partnership-Zhenjiang

Located in the southwest of Jiangsu Province, Zhenjiang is a prefectural-level city. It is on the northwest of Changzhou, east of Nanjing and to the south of Yangzhou and Taizhou. It is composed of three counties (county-level city), namely, Danyang, Jurong and Yangzhong, as well as four districts, namely, Jingkou, Runzhou, Dantu and Xinqu. It takes only 20 minutes from Zhenjiang to Nanjing or Changzhou by high-speed train. In order to prevent patient outflow, attract and retain talents, and win a competitive edge, the Zhenjiang government started public hospital reform in September 2009 and established two medical partnerships with Affiliated Hospital of Jiangsu University and Zhenjiang First People’s Hospital as the core and specialized hospitals and community medical service institutions as members (Zhenjiang Municipal Government, 2009). The Jiangsu Kangfu Health Network is a representative of tightly-knit medical partnership.

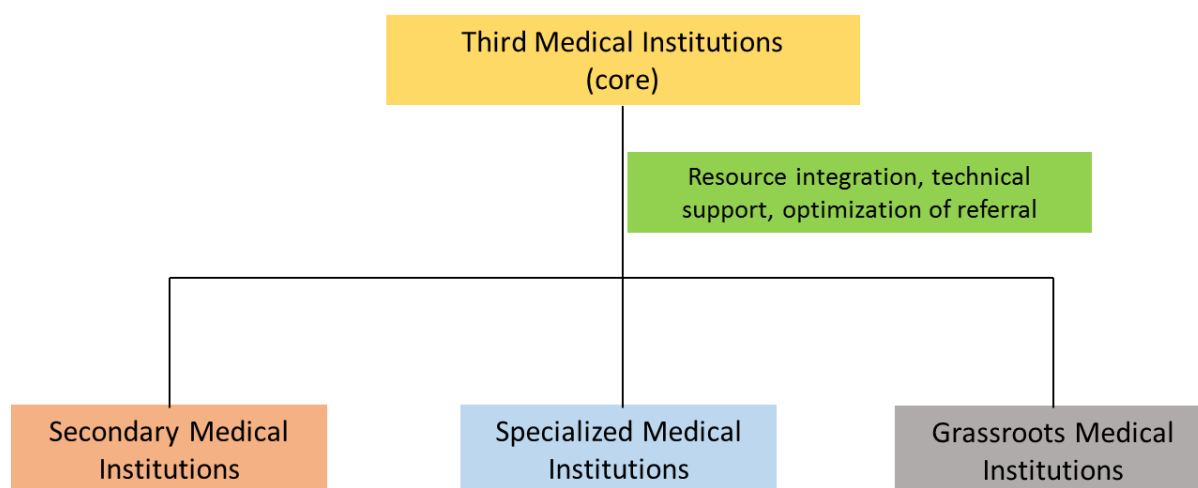


Figure 2-1 Structure of a typical medical partnership

a. Basic information

The Jiangsu Kangfu Health Network is established under the principle of “voluntary accession and asset as the bond”. The alliance includes Zhenjiang First People’s Hospital (level 3A general hospital), Zhenjiang Second People’s Hospital (level 2A general hospital), Zhenjiang Fourth People’s Hospital (level 3A maternity and child health hospital), Zhenjiang First People’s Hospital Xinqu Branch (level 2A general hospital) as well as several grassroots medical institutions. The Zhenjiang First People’s Hospital is at the core of the alliance (Zhang, 2014).

b. Management system

The Jiangsu Kangfu Health Network is a public welfare institution with legal entity. Entrusted by the municipal government, the municipal health administration department plays

the role of sponsor, responsible for development planning and supervision of group asset and operation. The medical institutions managed by the health group are secondary legal person and medical institutions joining the group with technology and management as the bond retain their original legal person status (Zhenjiang Municipal Government, 2009).

Board of directors is the decision-making department of the group and is composed of sponsor representatives, hospital legal representatives, employee representatives and other representatives. It has decision-making power over the major issues of group operation, major personnel appointment and removal, group development planning and performance management.

Board of supervisors is the internal supervision department and is composed of representatives from Zhenjiang municipal health department, Zhenjiang municipal financial department, Zhenjiang municipal labor and social security, hospital discipline inspection department, hospital labor union and the medical staff. It supervises board of directors, power of hospital group president and the operation and financial status of the group.

The group management is composed of hospital group president, vice president, chief financial officer and chief drug officer. The hospital group president, as the group legal representative, is the executor of group operation and management. The president has the operation and management power and personnel management power and is expected to implement decisions of board of directors.

#### c. Operation mechanism

**Resource integration:** Goods and materials within the group is allocated and distributed by the group. The hospital group integrates departments of member hospitals and establishes five professional management committee of medical affairs, health care, human resources, financial affairs and culture (Wan, Zhu, & Yang, 2013). It also establishes strategic management center, community health service management center, materials purchase and distribution, auditing, disinfection supply, information, clinical lab and medical image center to promote cooperation between large hospitals and grassroots medical institutions (Kong, 2014). Examination results are universally recognized within group member hospitals, which have improved efficiency of quality medical resource utilization. In addition, the group also increases investment on standardized construction to improve hardware facilities.

**Technical support:** The hospital group adopts various forms to strengthen talents training and medical skills building in the grassroots medical institutions. Before getting the title of a senior professional post, medical staff in secondary and tertiary hospitals must serve in the

grassroots medical institutions for at least one year. They should be in clinic all day long, take part in community patient visit, guide to write medical record and implement child care. The group offers continuing medical education to community medical staff so as to improve their professional skills and service capability. Experts in the group receive patients in the grassroots medical institutions, which strengthens management of grassroots medical institution and improves their service.

**Optimization of medical process and guidance of community initial diagnosis:** On the one hand, all the community medical institutions within the group have installed the “appointment registration system”, “discharge and admission management system” and “electronic medical record system” so as to guide residents to get initial diagnosis in community health institutions. Patients referred from community health institutions can enjoy “one exemption and three priorities” (exemption of registration fee, priority to make expert appointment, get auxiliary examination and get hospitalization). On the other hand, large hospitals and community health centers within the group have signed dual referral contracts with each other to set up referral reception and a courtesy window for community patients. A dual referral information platform is established with a number of supporting measures.

**Guidance of tiered diagnosis and treatment with policy:** Zhenjiang implemented a trial of community health service institution initial diagnosis system to increase the compensation proportion of emergency treatment fees and hospitalization fees for the insured in community health service institution (Liu et al., 2002; Zhou, Zhou, & Zhang, 2010). The government has reduced the proportion of individual payment in treatment of community health center and gives favorable policies to community health centers. The government makes assessment and supervision on the downward referral rate of secondary and tertiary hospitals, and they will be punished when failing to meet the requirement (Zhai & Kong, 2012).

**“3+X” family health responsibility team building:** “3+X” family health responsibility team is a new type of health service mode with general practitioners as the main body, hospitals in the group and human resources as the support, community resident health management as the service content and contractual service as the form. The “3” is made up of general practitioners, community nurses, and prevention and health care personnel. Each group has at least three members and general practitioner is the core. “X” is composed of hospital group doctors, nurses, administrative personnel and volunteers. The hospital group actively takes part in the “3+X” family health responsibility team, sending at least two full-time general practitioners to each community health center with more than 200 personnel in the group service.



The goal is to promote community initial diagnosis system, dual referral system and collaboration system between public hospitals and community health institution so that general practitioners can actually act as the “gatekeeper” of public health (Zhenjiang Municipal Government Office, 2011).

#### d. Results

Zhenjiang adopts a labor division and collaboration system, makes innovations to the grassroots medical service mode, establishes an information sharing system and forms a tiered treatment mode of dual referral, differentiation between acute and chronic disease and combination of prevention and treatment. The general level of health literacy has increase from 6.96% in 2009 to 27.2% in 2014. Prevalence of high blood pressure and diabetes has been on the decrease, and more than 55% of emergency patients get treatment in grassroots medical institutions. In 2014, there were 664,000 and 325,000 outpatient visits of high blood pressure and diabetes patients in the hospital group, and among them 474,000 and 218,000 outpatient visits were made in community medical institutions, accounting for 70% and 68% (Zhenjiang Health and Family Planning Commission, 2015).

#### (2) Semi-tightly-knit direct management model-Wuhan

Wuhan is the capital of Hubei Province, the only sub-provincial city and megacity in central China, and important industrial base, scientific and educational base and transportation junction. By the end of 2015, Wuhan had 13 districts with a resident population of 10.6077 million (Wuhan Statistical Bureau, 2016). The Wuhan Fifth Hospital Medical Partnership is a typical semi-tightly-knit hospital group.

##### a. Basic information

Wuhan Fifth Hospital is the only level 3A general hospital that integrates treatment, teaching, scientific research and prevention in Hanyang. In 2008, under the instruction of CPC Hanyang Committee and Hanyang District government, the Wuhan Fifth Hospital began to directly manage the personnel and property of six government-funded community health service centers and became a direct-management medical partnership.

##### b. Management system

The six community health service centers retain their independent legal person entities and are directly managed by Wuhan Fifth Hospital.

**Appointment and removal of major leaders:** Directors of the community health service center are all employed by competition and are appointed by Wuhan Fifth Hospital. They

usually rotate the positions every two years and they are supposed to attend the biweekly meeting of the Wuhan Fifth Hospital. Their basic salary is paid by the Wuhan Fifth Hospital, and their performance salary is dependent on the performance of the community health service center.

**Financial management:** The fund of community health service center is still allocated by district health and family planning commission. The Wuhan Fifth Hospital will not use fund of the community health centers, but their heads of financial department and chief accountants are assigned by the Wuhan Fifth Hospital. Leaders of the community health service center have certain signing authority of entertainment expense, but if the expense exceeds the standard, they must ask for permission from their leaders.

c. Operation mechanism

**Personnel management:** The old employees of the community health service centers remain unchanged, while new employees are hired by the Wuhan Fifth Hospital through personnel agent. Their basic salary is paid by the Wuhan Fifth Hospital and their performance salary is dependent on performance of the community health center. The employees at the community health center can take exams to be official staff of the Wuhan Fifth Hospital.

**Resource sharing:** Inside the medical partnership, there is no intensive management center and in practical operation, the community health centers will send all cases apart from basic examination to the Fifth Hospital. Patients are charged by the standard of primary hospitals. The Fifth Hospital charges the cost and the community health center get the price difference. The tests are universally recognized in the medical partnership. Some community health service center LIS has been connected to the Wuhan Fifth Hospital and can obtain examination results in real time. In addition, the medical partnership actively promotes PACS and HIS connection to share patient information and image data.

**Technical support:** As for promotion of tiered treatment and dual referral, the Wuhan Fifth Hospital focuses on improving community service capability. It arranges technical backbones to hold a concurrent post in community health center as department head and assigns personnel with the senior professional title and young and middle-aged backbones to offer medical service in communities. They receive subsidies every month from hospital and the government and train and re-hire community personnel. Doctors whose patients are referred to community health centers are required to visit their patients.

**Optimization of medical process:** The government has bought Health Express vehicles

for every community for dual referral. The Wuhan Fifth Hospital has set up dual referral green channel and established community management department for supporting work of community health service centers. The Fifth Hospital established a doctor phone follow-up system and chief physician regular ward rounding system. Currently, once chronic disease patients are discharged, the community management department will notify the community.

#### d. Results

After six years of efforts, both the Wuhan Fifth Hospital and the community health service centers have achieved significant development. The workload of the community health centers has been increasing by 10% every year, and the average hospitalization period of patients in the Wuhan Fifth Hospital has been decreasing. Among the six community health centers, two are rated as national level centers and one is rated as provincial center. The overall strength of the six centers belongs to top 30 among the 120 community health centers in Wuhan and two belongs to top 5 (Huang & Yi, 2015). The Wuhan Fifth Hospital gives full support to community health centers in terms of personnel management, medical operation, and service optimization, so that the primary community health centers can be managed as tertiary hospitals. The large hospital directly takes part in chronic disease management. Diseases that can be treated in community health centers will be treated in community level, those difficult diseases will be referred to large hospitals. It ensures medical safety and controls medical cost.

#### (3) Loosely-knit model featuring partner assistance-Shanghai

Shanghai is a municipality directly under the central government. It is the economic, transportation, science and technology, industrial, financial, trade, exhibition and shipping center. Located in the estuary of the Yangtze River, it is north to Hangzhou, south to Jiangsu province and east to Zhejiang province. The first regional medical partnership - Ruijin-Luwan Medical Partnership is a typical loosely-knit alliance.

##### a. Basic information

Luwan District is located in the downtown area of Shanghai and was incorporated into Huangpu District in 2011. The Ruijin-Luwan Medical Partnership is composed of seven medical institutions: one tertiary hospital Ruijin Hospital, two secondary hospitals Ruijin Hospital Luwan Branch (Luwan Central Hospital) and Luwan Dongnan Hospital, and four primary hospitals Wuliqiao, Dapuoqiao, Middle Huaihai Road, and Second Ruijin Road community health service centers.

##### b. Management system

The medical institutions under the alliance all have independent legal person status. Rules and regulations are their common criteria, and management and technology are the connecting bond. The medical partnership council is the top decision-making body, responsible for the development planning, resource coordination and allocation of medical insurance quota. It adopts director responsibility system (Lin et al., 2013). The Shanghai government gives subsidy to the council every year for management and construction of medical partnership. In 2015, the Luwan Dongnan Hospital transformed to Shanghai Ruijin Rehabilitation Hospital and was managed by Ruijin Hospital.

c. Operation mechanism

**Personnel and financial affairs system:** Presidents of member hospitals are nominated by the medical partnership chief and approved by the council. The medical partnership implements unified financial management, sets up unified logistics service platform and purchases medical equipment, drugs, and consumables in a centralized manner.

**Resource sharing:** Information technology is applied within the medical partnership. It establishes image diagnosis center and examination center and the examination results can be shared and recognized within the alliance. It also promotes tele-medicine system, office automatization system and clinical knowledge database platform. These platforms are favorable for the implementation of one-stop payment.

**Technical support:** The Ruijin Hospital sends senior doctors to act as “chief doctor” in community health service centers, responsible for community doctor training and dual referral. In addition, doctors in community health service centers have two-year off-duty visiting experience in Ruijin Hospital. Ruijin Hospital does not interfere with quality management of other member hospitals.

**Optimization of medical process:** The medical partnership hopes to promote the formation of “initial diagnosis in communities and dual referral” model through policy guidance and change of patient habits. The medical partnership signs contracts with residents and community residents can choose to get treatment within the medical partnership or in any hospital within Shanghai. Residents having signed contracts can enjoy price cut-downs if they make initial diagnosis in communities and be referred tier by tier. Contracted residents have the priority to be referred to nearby community health center for rehabilitation, while those having not signed the contract do not have the privilege. The Shanghai government has widely promoted family doctor system and once the contract is signed with the medical partnership, residents will have a number of “benefits” such as health assessment and appointment

registration for experts.

#### d. Results

Ruijin-Luwan Medical Partnership only signed contract with 100 households in Luwan District and the number of subscribers started to increase since 2014. After the medical partnership was established in 2011, the Luwan Branch sent medical staff to Ruijin Hospital and since then, the major medical indicators of Luwan Branch had experienced significant changes. The outpatient and emergency visits increased from 476,000 person times in 2010 to 574,000 person times in 2013, the amount of hospitalized patients increased from 12,085 to 12,968, and the amount of surgeries increased from 3,500 to 7,000 (Zhu et al., 2014).

#### (4) Summary

The tightly-knit medical partnership in Zhenjiang has established various materialized intensive management center (Zeng, 2013), exercising unified allocation and management of medical resources within the alliance. The Wuhan medical partnership is a semi-tightly-knit one. It explores the direct management model and achieves integration of ownership and assets. However, the community health service centers have independent legal status and autonomy over personnel and financial affairs. With medical skills as the bond, the Ruijin-Luwan Medical partnership in Shanghai is a loosely-knit alliance. It still has many drawbacks in administrative management, resource allocation and medical insurance settlement. All the three models prioritize improving service capability and level of grassroots medical institutions, open green channel to referral patients and exert positive impact on implementation of tiered diagnosis and treatment system.

### **2.2.2 County medical service community-Tianchang**

According to the *Implementation Opinions of General Office of the State Council on the Overall Promotion of County-Level Public Hospital Reform* (General Office of the State Council, 2015a), county government is the main body to run county public hospitals, and every county or county-level city should run one to two public hospitals. The government encourages other public hospitals to transform to grassroots medical institutions, specialized hospitals or aged care and rehabilitation institutions by means of relocation, integration, and transformation. The government can also consider public hospital reform and recombination. Currently, the universally recognized pattern of tiered diagnosis and treatment is county-level medical service community. The medical community integrates payment reform of medical insurance and development of the medical community, offering integrated service covering prevention,

treatment and rehabilitation and connecting counties, townships and villages. The medical community in Tianchang of Anhui Province has become a model in the country.

We will present basic information, management system, operation mechanism, results and a summary.

#### (1) Basic information

Tianchang belongs to Chuzhou, Anhui and is located in the east of Anhui. Apart from Laian County of Anhui Province, Tianchang is surrounded by five counties and county-level cities (Yizheng, Liuhe, Jinhu, Xuyi and Gaoyou) of Jiangsu Province and is a member of the one-hour metropolitan circle of Nanjing. Before the medical community is built, there are a number of problems such as weak grassroots medical service capability, low level of medical skills, disordered treatment, insufficient medical insurance foundation, low level of informatization, and patient outflow to Nanjing.

In 2015, the Health and Family Planning Commission of Anhui Province selected 15 counties to implement trial reform of county medical service community, and Tianchang is among the 15 counties. Tianchang Public Hospital Management Committee issued the *Implementation Plan of Trial Work of County Medical Partnership Service in Tianchang* (2015a). According to this document, the secondary hospitals in Tianchang take the leading role and establish three horizontally competitive medical communities with central hospitals and township hospitals. The three medical communities are as follows: first, Tianchang Hospital Community (first hospital community), covering Tongcheng Town, Chajian Town, Renhe Town, Shiliang Town, Wanshou Town, Yeshan Town, Tianchang Sub-district and eastern part of Yangcun Town; second, Tianchang Traditional Chinese Medicine Hospital Community (second community), covering Jinji Town, Datong Town, Zhangpu Town, Xinjie Town, Zhengji Town, Yongfeng Town, the western part of Yangcun Town; third, Tiankang Hospital Community (third community), covering Qinlan Town.

Government departments in Tianchang have issued a number of documents including *Implementation Plan of Village Doctor Contracted Service in Tianchang* (Tianchang Health and Family Planning Commission, 2015a), *Implementation Plan of Partner Assistance in Medical Community* (Tianchang Public Hospital Management Committee, 2015b), *Implementation Plan of “Three Appraisals and Three Promotions” in Township Hospitals* (Tianchang Health and Family Planning Commission, 2016a), *Opinions on Further Strengthening Team Building of Village Doctors* (Tianchang Public Hospital Management Committee, 2015c), and *Implementation Plan of Payment on Headcounts in Medical*

*Community* (Tianchang Health and Family Planning Commission, 2015b) so as to give policy support to the medical community. In 2016, the Tianchang government issued *Implementation Plan of Tianchang to Further Medical and Health Care Reform*, requiring further promoting county medical community and building a preliminary tiered diagnosis and treatment system (Tianchang People's Government, 2016).

## (2) Management system

As the sponsor, the municipal medical management committee plays the role to run hospitals as a government body. It is the decision-making organ of county-level public hospitals. The institutional structure and relationship of administrative subordination of member hospitals in the medical community remain unchanged. Under the leadership of municipal medical management committee, the leading hospitals sign contract with counterpart member hospitals and a medical community council is established as the decision-making organ to manage major issues such as general planning, operation policy, asset allocation, financial budget and final account, income allocation and human resources management. The county medical community has one president and several directors, and presidents of member hospitals are responsible for the operation of their own hospital under the leadership of the medical community. There is an office under the medical community council and there are special personnel in charge of the daily work of the council. The financial affairs, business management and performance assessment are unified within the medical community (Tianchang Public Hospital Management Committee, 2015a).

## (3) Operation mechanism

### a. Reform of medical insurance payment system

The medical insurance for urban residents and the new rural cooperative medical system is integrated to realize unified coverage, fundraising policy, security treatment, health insurance directory, and fund management. The medical insurance payment reform is improved. The payment mode is an integration of payment by headcounts, payment by diseases and global budget. The negotiation and risk sharing system between medical insurance institutions and drug supplier is established (Tianchang Health and Family Planning Commission, 2015b).

### b. Clear division of labor

Village doctors mainly offer contracted service to community residents. The contracted service and contracted referral makes it possible for the public to get initial diagnosis in communities. Township hospitals are responsible for treatment of common diseases and

management of chronic diseases, while city hospitals are responsible for treatment of common diseases and difficult diseases. There is a green channel for dual referral between township hospitals and city hospitals. Patients choose to get treatment in different medical institutions according to their condition (Tianchang Public Hospital Management Committee, 2015a).

c. Optimization of referral

The medical community establishes the dual referral procedures, designates special personnel to manage dual referral work, formulate fluent information linkage, identify the responsibilities and tasks, encourage diagnosed chronic disease patients and rehabilitative patients to receive follow-up treatment in communities and formulates rehabilitation methods and medical insurance reimbursement settlement method. Patients signing family doctor service contract can have one hospitalization fee deductible in township hospitals, so are those referred from large hospitals to community medical institutions.

d. Resource sharing

The medical community has established image diagnosis, examination, pathological diagnosis, electrocardiogram diagnosis, remote consultation and disinfection supply centers and all of them are open to community hospitals. The county-level leading hospitals choose some departments to form one-to-one partner assistance relationship with member hospitals, and the revenue is shared by two parties.

e. Technical support

Measures such as expert consultation, partner assistance, key discipline assistance, talent training and remote information assistance are adopted to let the quality medical resources in county public hospitals to play a leading and guiding role. There is an “1+1+1” apprentice relationship among secondary medical institutions, grassroots medical institutions and village clinics. The assistance-offering medical institutions help those assistance-receiving hospitals formulate talents training plan and help them implement the plan, they offer free further learning and training for medical staff in township hospitals and give academic lectures to them. Before obtaining intermediate or senior professional title, medical staff in county-level hospitals within the medical community must serve at least six months in township hospitals and those serve more than one year have the priority to be promoted.

(4) Results

Initial results have been achieved since the establishment of the medical community. The tiered diagnosis and treatment pattern has been taking shape, the medical service capability has



been improved, and the goal of “minor diseases treated within the village and major diseases treated within the county” has been basically realized, with the consultation rate reaching 92.24% within the county (China Central Television [CCTV], 2017). Take Tianchang First Hospital as an example, in 2016, the amount of upward and downward referral patients was 1,369 and 4,940, the number of patients getting treatment outside the county decreased by 2%, and usage of medical insurance fund has decreased from 28% to 22% (CCTV, 2017). As for grassroots medical institutions, the amount of outpatient visits has increased by 11%, and the medical revenue has increased by 10.29%. Efficiency of usage of the medical insurance has been improved, as the actual compensation percentage has increased to 70%, which means patients only need to pay 30%, down 10% compared with that in 2015 (CCTV, 2017).

### (5) Summary

The Tianchang medical community is a good example to improve county medical service level, promote tiered diagnosis and treatment, and offer accessible medical service to the general public. The Tianchang medical community can be further divided into four “communities”: interest community with medical insurance fund as the bond; responsibility community based on tiered diagnosis and treatment system; development community based on coordinated development; and service community by offering whole-process health management. However, the ownership, functional positioning, financial compensation policy and government investment mode of the medical institutions within the community remain unchanged. There is no substantial progress as for asset restructuring. The community is only a “league of mutual help” based on a “written agreement”. Whether this pattern is sustainable remains unknown.

## 2.2.3 Specialized medical partnership

Specialized medical partnership is a cross-regional or cross-health-alliance league led by a specialized hospital. There are national ones and regional ones and respective representatives are China National Respiratory Clinical Research Center-China-Japan Friendship Hospital Medical Cluster for Respiratory Diseases and the Anhui Provincial Medical Partnership for Children’s Diseases.

(1) National specialized medical partnership-China national respiratory clinical research center-China-Japan friendship hospital medical cluster for respiratory diseases

In August 2016, the China-Japan Hospital and nearly 170 tertiaries, second and county-level hospitals across China established the China National Respiratory Clinical Research

Center-China-Japan Friendship Hospital Medical Cluster for Respiratory Diseases (MCRD). There are two business levels in the alliance. China-Japan Friendship Hospital takes the generally coordinating role and is responsible for difficult, critical and acute patients, while member hospitals are responsible for the prevention and treatment of common respiratory diseases. The member hospitals can resort to China-Japan Friendship Hospital or other member hospitals, if other member hospitals are also incapable, the patient can be referred to China-Japan Friendship Hospital (Liu, 2017).

The responsibilities of the MCRD are as follows: first, establish respiratory specialized talents training system, promote respiratory diagnosis and treatment standard, and enhance respiratory diseases diagnosis and treatment level; carry out online teaching and ward rounding, case discussion and academic exchange through remote health care platform and internet medical platform; second, establish a consultation center for difficult, critical and acute respiratory diseases; third, establish a tiered referral system for respiratory diseases, patients with chronic diseases or common respiratory diseases can get treated in regional medical institutions, those who are difficult to diagnose or the treatment is not effective can be referred to higher level hospitals or the China-Japan Friendship Hospital, and they can be referred to nearby hospitals for follow-up treatment and rehabilitation; fourth, promote smoking-quitting and respiratory disease prevention; fifth, use the internet service platform to establish an exchange platform for respiratory doctors, strengthen horizontal connection among respiratory doctors and hold case discussion and academic exchange activities; sixth, collect respiratory disease cases, carry out multi-center cooperative clinical research project and promote the development of respiratory discipline in China; seventh, expand the influence of the medical partnership, explore remote medical referral and medical insurance payment coordination system so as to establish cross-provincial tiered diagnosis and treatment pattern. As this alliance has quite a short history, so there is no data reflecting its achievement (Liu, 2017).

(2) Regional medical partnership-Anhui provincial medical partnership for children's diseases

In 2014, the Anhui Provincial Children's Hospital established the Anhui Provincial Medical Partnership for Children's Diseases, which is made up of 62 member hospitals and covers 16 cities (Anhui Provincial Government Development Research Center & Anhui Provincial Health and Family Planning Commission, 2016). The alliance established the first Medical Association for Children to provide pediatric talents for the grassroots hospitals. Anhui Provincial Children's Hospital joined Beijing Children's Hospital and offer top expert treatment

service for patients within the alliance, establishing a country-province-city- community green treatment channel. The alliance established Anhui Children Emergency Center, formed a children emergency team, deployed referral vehicles and medical equipment and regularly taught community residents the first aid methods. The alliance established Anhui Pediatrics Professional Quality Control Center. The alliance also opened various green channels in appointment registration and treatment, tiered diagnosis and treatment and dual referral, examination, critical patient transferring, remote treatment and information sharing (Anhui Provincial Government Development Research Center & Anhui Provincial Health and Family Planning Commission, 2016).

In more than one year after establishment of the alliance, more than 3,709 patients were transferred to the Provincial Children's Hospital through the green channel of the alliance and the children's 120, and 2,883 of them get out of danger after emergency treatment. About 30% of the patients were referred to grassroots medical institutions. After training, the service capacity of the medical staff has been significantly enhanced. The consultation rates of 15 randomly selected member hospitals increased substantially. The outpatient volume has increased by 18.6%, the amount of hospitalization has increased by 12.5%, and the amount of surgeries has increased by 4.3% (Anhui Provincial Government Development Research Center, Anhui Provincial Health, & Family Planning Commission, 2016).

### (3) Summary

Apart from the two specialized medical partnerships, there are also other specialized medical partnerships such as rehabilitation medical partnership (Xu, 2016), stroke medical partnership (Sun et al., 2016), and tuberculosis medical partnership (Liu & Kang, 2016). The specialized medical partnership is a supplement to general medical partnership. The specialized medical partnership is an important way to connect national, provincial, municipal and grassroots medical resources, and it is also an important way to promote development of the specialized disciplines. The specialized medical partnership is bonded with medical skills, the management and operation of members are relatively independent, and all of them have a relatively short history, so its continuity and role on tiered treatment is yet to be observed.

## 2.2.4 Summary

Nowadays tiered diagnosis and treatment is the major policy to solve the problem of "difficult access to medical services", but the effect is not satisfactory. It is found in foreign tiered diagnosis and treatment model that grassroots medical institutions are the first tier of

medical service system and it is key to the success of tiered diagnosis and treatment. In addition, apart from compulsory means, medical insurance payment is also an effective way to guide treatment sequence. Although the medical expense in the US is among the highest in the world, its treatment sequence is in order, and this orderly sequence is not realized by administrative decree but guided by developed commercial medical insurance. Besides, the medical institutions are positioned according to their functions, rather than its size, and the tier does not refer to the level of medical skills.

China has been exploring tiered diagnosis and treatment for many years, and regional medical partnership has been recognized by the central government and promoted across the country. However, many medical partnerships exist in name only with many problems. First, many medical partnerships are not established for integration of medical resources; instead, most are just completing tasks assigned by the government. In addition, regional medical partnerships lack integrity, since member hospitals in most medical partnerships are independent to each other. There is no norm or coordination mechanism inside the alliances and the fundamental interests of every member remain untouched. Member institutions within county medical partnership are also relatively independent, and the alliance is a loosely-knit league of mutual help. Specialized medical partnership is a supplement to regional medical partnership, and its effect is yet to be observed.

## **2.3 Stakeholder theory**

The proposal of Stakeholder Theory questions the belief of “shareholder supremacy”. The public have gradually realized that enterprises not only serve shareholders, but also, among others, many communities closely related to the survival of the enterprises. Having been developed for more than 30 years, Stakeholder Theory has been widely applied in fields such as education, economy, health, business management and ecosystem management. The Theory provides a wide range of reference for policy formulation and amendment. This thesis reviews the development of Stakeholder Theory, stakeholder research methods, definition and classification of stakeholders, and the application of Stakeholder Theory in the health industry.

### **2.3.1 Development of stakeholder theory**

It is difficult to trace the specific origin of the term “Stakeholder” since the term was brought up long time ago, and the term “Stakeholder” was first applied to modern management

theory in a management document included in the internal memorandum of the Stanford Research Institute (referred to as SRI) (Freeman, 1984). Stakeholders were originally defined as the groups which cannot survive without the support of communities such as shareholders, employees, customers, suppliers, creditors and societies (Freeman, 1984). However, this definition was one-sided because it considered only the impact of stakeholders on the enterprise and did not take into account the influence of business development on stakeholders. On the basis of SRI's early research, scholars mainly developed the stakeholder theory from perspectives such as corporate planning, systems theory, corporate social responsibility, organization theory and strategic management (Freeman, 1984).

### Corporate planning

Ansoff (1965) argues that Stakeholder Theory does not distinguish the connotation of responsibility from the one of objective but confuses the two concepts. The enterprise's goals need to be achieved by balancing the conflicts of interests among stakeholders. Ansoff advocates integrated advantages of the organization and disapproves to divide objectives into economic ones and social ones. Ansoff holds a different view of stakeholder theory from the definition of SRI, which believes that enterprises cannot survive without the support of key communities.

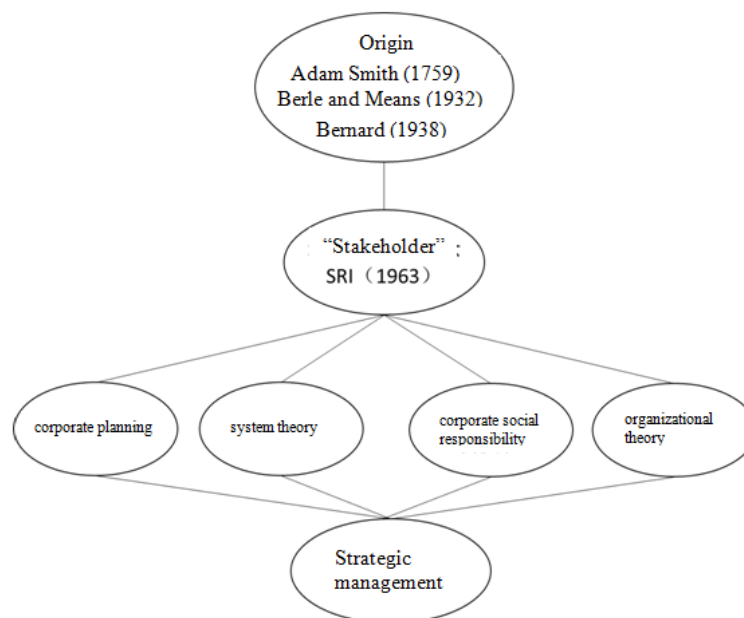


Figure 2-2 History of the term “Stakeholder”

Source: Freeman (1984)

Ansoff believes that the necessity of stakeholders for the survival of organizations depends on many context variables, which is a constraint on the goal achieved at a particular point of

time and an accidental phenomenon. Taylor (1971) believes that corporates are operated ultimately for the benefit of stakeholders and shareholders would become less important. Hussey and Langham (1978) analyze the importance of management in corporate planning by applying an environmental model which includes the organization and its stakeholders. The history of the term “Stakeholder” is shown as the Figure 2-2.

### **Systems theory**

In the mid-1970s, Ansoff's views attracted the attention of researchers in systems theory represented by Ackoff and Churchman. Ackoff (1974) re-explains Ansoff's views and provides a systematic approach to stakeholder analysis. He regards the organizational system as an open system in which, based on the interaction and support from stakeholders, many social issues can be resolved by redesigning the underlying systems that support and influence stakeholders, Ackoff believes that the system can be completed only if all stakeholders are included. The systems theory believes that organizational planning is only carried out within the scope of the system objectives, and it is wrong to make specific plans for a particular organization in the system. Two important variables need to be considered in the systems theory, the co-optation view, i.e. the future of the organization that the organization plans with its stakeholders, and the cooperation that subgroups of stakeholders conducted for their respective futures. Therefore, it is necessary and significant to consider the appeals of different stakeholders and continuously improve the stakeholder system model that emphasizes participation, which is also the future development trend of stakeholders (Freeman et al., 2010).

### **Corporate social responsibility**

Since SRI proposed the term “stakeholder”, many scholars have used the term as a starting point to apply stakeholders into the studies of corporate social responsibility. These studies focused on meeting the interest appeals of the general public, local communities, and employees, with less emphasis on meeting the needs of all stakeholders. Research in this period was represented by the ones conducted by scholars at the Berkeley School of Management and Harvard Business School. Votaw (1964) from Berkeley School of Management conducts research on enterprise's power in Europe. Epstein (1969), by studying politics and commerce in the US, points out that enterprises should not be restrained by the nature or extent of the political activities they participate in. He also agrees that joint political participants should be limited by information disclosure and lobbying requirements. Sethi (1970) analyzes the battle between Kodak and the FIGHT group to explore the role of the minority in the enterprise. Scholars from Harvard Business School have connected research and strategies on social issues

with traditional areas of organization and built a corresponding model of corporate society in which enterprises respond to the pressures of social change in a forward-looking manner (Ackerman, 1975; Ackerman & Bauer, 1976; Murray, 1976). Meanwhile, the research on corporate social responsibility has also suffered numerous criticisms, among which the most important issue is to define the deep nature of corporate social responsibility. Corporate social responsibility is often seen as an addition to a normal enterprise. At present, commercial organizations are faced with a turbulent external environment consisting of economy, society, and politics. It is difficult to describe and predict the real business world in only one aspect of society or economy. Although the research on corporate social responsibility focuses on social and political issues, the general approach to integrating these issues into the corporate strategic system has not been found yet (Freeman, 1984).

### **Organization theory**

In the 1960s, scholars of organization theory started to define relationship between organization and the environment. Evan (1965) proposes concepts and assumptions that can be applied to study cross-organizational phenomena. He believes that the majority of organization studies are too focused on intra-organizational relationships. Kazt and Kahn (1966) advocate studying the organization with an open system approach that analyzes organizations in larger systems. Lawrence and Lorsch (1967) build differentiated and joint models to deal with organization-specific external environment by subdividing the organization into smaller units. Pfeffer and Salancik (1978) construct an organizational-environment interaction model based on the interdependence among the organization resources, the organization, and the environment that provides resources to the organization. These two scholars believe that the survival of the organization depends on its benefits, which originates from the management of needs, especially the needs of stakeholder communities which provide resources and support the organizations rely upon. Pfeffer and Salancik have a similar definition of interest groups to the one of SRI. Although the research of organization theory generally does not build a framework for the executive direction of organizations, it is rare for literatures on organization theory to clearly match the ones on strategic management theory, so do literatures on system management theory and corporate social responsibility theory. However, research in these fields has laid the groundwork for methods to study stakeholders (Freeman, 1984).

### **Strategic management**

The technical assessment method of Davis and Freeman (1978) and the strategic hypothesis analysis method of Mitroff, Emshoff, and Kilmann (1979) apply the stakeholder

concept to manage process issues in strategic planning. Scholars such as Mitroff believe that stakeholder analysis is different from shareholder analysis since the former analysis requires administrators to consider all communities that influence major decisions or are affected by major decisions. Dill (1975) describes stakeholder relationships with impact and responsibility and examines multiple relationships between enterprise owners and various parties such as investors, customers, competitors, employees, suppliers, service dependency, indirect consumers of products, taxpayers, students, analysts, and researchers. Dill believes that these stakeholders influence enterprises through protest, voting, and regulation while enterprises can respond to stakeholder intervention through open communication. Dill emphasizes that the role of stakeholders is gradually shifting from influencers to participators in the strategic planning and management of the enterprises. Since then, scholars have recognized that the management of modern enterprises is becoming more and more sophisticated and the stakeholder-oriented strategic planning is more effective in the regulating plans of enterprises. Mahon and Murray (1981) suggest shareholder administrators integrating economic, political, and social goals in their strategic planning and trying to meet the needs of external stakeholders. Pearce (1982) argues that administrators must meet the demands of internal and external stakeholders when developing corporate responsibilities and he lists some stakeholder demands. For example, shareholders demand for return on investment, employees for job satisfaction, customers for value for money, suppliers for trustworthy buyers, government for compliance, union for the benefit of its members, competitors for fair competition, community for the enterprise being accountable to the public, and the general public for the enterprise to improve their quality of life. Freeman (1984) believes that stakeholders in an organization refer to any group or individual that can influence the achievement of the enterprise's goals or be influenced by realizing the enterprise's goals. When applying the stakeholder strategic management framework, one cannot miss any group or individual that can affect the enterprise's goals or be affected, should have a rational perspective on stakeholders of the organization and their demands, analyze the relationship between organization management and stakeholders, build a stakeholder map, analyze the exchange characteristics between organization and stakeholders, and deduce whether these negotiations comply with the stakeholder map and the method by which organizations manage its stakeholders. Typical corporate stakeholders are shown in Figure 2-3. Subsequent research, based on Freeman's framework, explores the role of stakeholders in the analysis, planning, and implementation of corporate strategy.



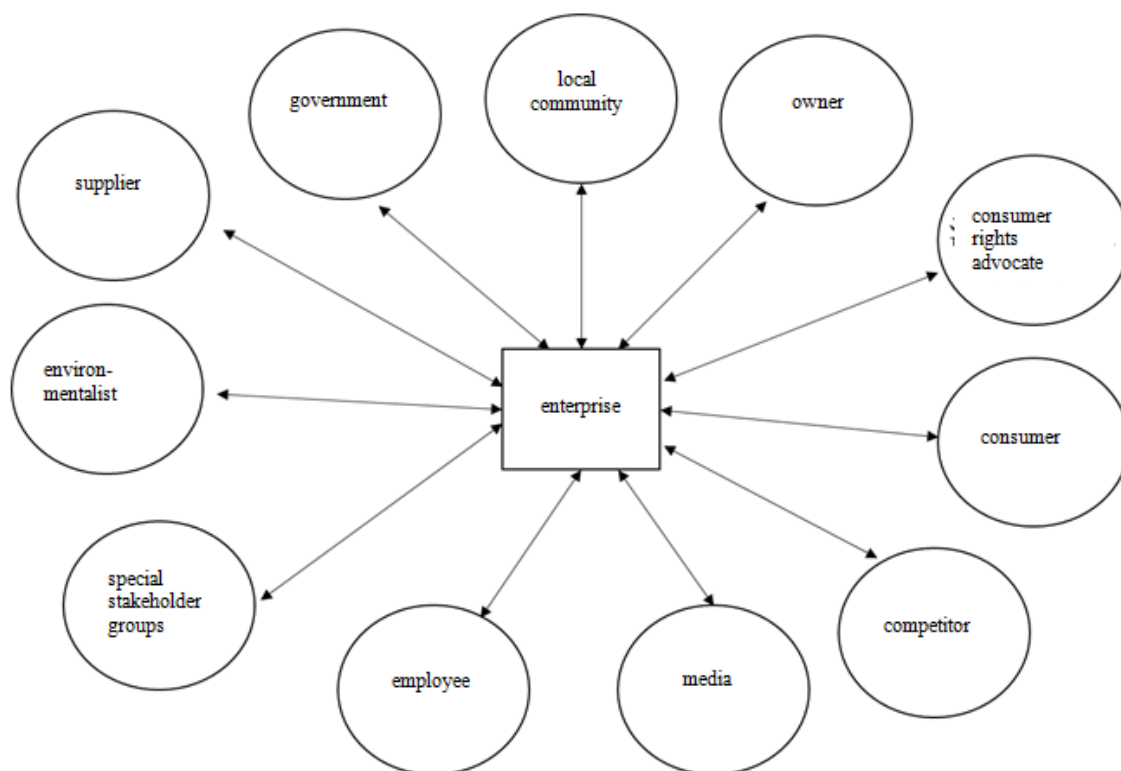


Figure 2-3 Enterprise’s stakeholders

Source: Freeman (1984)

### 2.3.2 Research method of stakeholder

Freeman (1984) provides a research method for strategic management of enterprises on the basis of stakeholders, which includes three parts, i.e. building a stakeholder framework and ideology (building stakeholder map, environmental scanning and others, and interacting with stakeholders), formulating strategic management procedures (determining the direction of organization’s development, developing strategies at the company level, and developing stakeholder strategies), and implementing and supervising stakeholder strategies.

Jiang and Jin (2009) divide the research method of enterprise's stakeholders into five steps (See Figure 2-4): firstly, identify stakeholders and clarify their interests; secondly, analyze the natures of stakeholders and priorities of interests of stakeholders; thirdly, determine the goals of the enterprise and formulate strategic plans based on stakeholder's interests; fourthly, analyze the dependencies between the enterprise and the prioritized stakeholders; finally, determine the cooperation mode and management mechanism between the enterprise and the stakeholders.

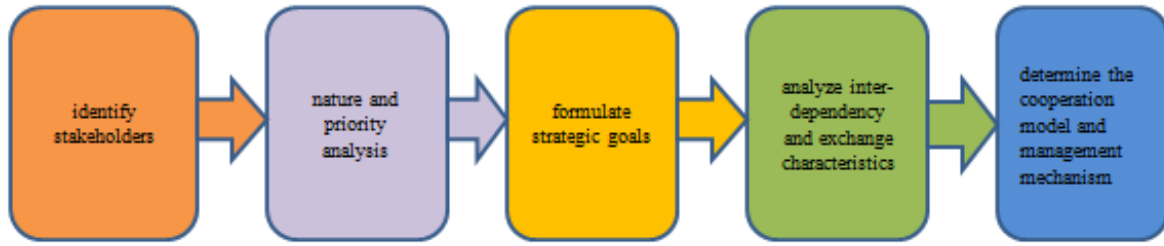


Figure 2-4 Management procedure of enterprise’s stakeholders

Source: Jiang and Jin (2009)

Similar to the method proposed by Jiang and Jin (2009), the research method of stakeholders in the healthcare industry is mainly divided into the following six steps: firstly, define the stakeholders of the research object, which usually uses Freeman's broad definition as a model; secondly, conduct preliminary description of stakeholders; thirdly, classify stakeholders and identify core stakeholders; fourthly, describe the characteristics of core stakeholders in terms of resources, power, and standpoint; fifthly, formulate strategies based on the research results of stakeholders and research purposes; sixthly, evaluate the proposed strategy (Luo & Jiang, 2011).

**2.3.3 Definition and classification of stakeholders**

The first step of stakeholder research is to define and categorize stakeholders. Specific research methods mainly include multi-dimensional approach and Mitchell score-based approach. At present, the Mitchell score-based approach is more widely used.

**2.3.3.1 Definition of stakeholders**

Scholars have provided several definitions of stakeholders after years of research. Mitchell, Agle, and Wood (1997) summarized 27 definitions (See Table 2-1). All the definitions are rational to some extent and Freeman’s (1984) definition is widely used and has become a paradigm for later researchers to define stakeholders.

Table 2-1 Definition of stakeholders

Source	Definition
Stanford Memo, 1963	“those groups without whose support the organization would cease to exist” (cited in Freeman and Reed, 1983; Freeman, 1984).
Rhenman, 1964	“are depending on the firm in order to achieve their personal goals and on whom the firm is depending for its existence” (cited in Nasi, 1995).

Ahlstedt and Jahnukainen, 1971	“driven by their own interests and goals are participants in a firm, and thus depending on it and whom for its sake the firm is depending” (cited in Nasi, 1995).
Freeman and Reed, 1983	Wide: “can affect the achievement of an organization's objectives or who is affected by the achievement of an organization's objectives”. Narrow: “on which the organization is dependent for its continued survival”.
Freeman, 1984	“can affect or is affected by the achievement of the organization's objectives”.
Freeman and Gilbert, 1984	“can affect or is affected by a business”.
Cornell and Shapiro, 1987	“claimants” who have “contacts”.
Evan and Freeman, 1988: 75-76	“have a stake in or claim on the firm”.
Evan and Freeman, 1988: 79	“benefit from or are harmed by, and whose rights are violated or respected by, corporate actions”.
Bowie, 1988	“without whose support the organization would cease to exist”.
Alkhafaji, 1989	“groups to whom the corporation is responsible”.
Carroll, 1989	“asserts to have one or more of these kinds of stake” – “ranging from an interest to a right (legal or moral) to ownership or legal title to the company’s assets or property.
Freeman and Evan, 1990	contract holders.
Thompson et al., 1991	In “relationship with an organization”.
Savage et al., 1991	“have an interest in the actions of an organization and...the ability to influence it”.
Hill and Jones, 1992	“constituents who have a legitimate claim on the firm...established through the existence of an exchange relationship” who supply “the firm with critical resources (contributions) and in exchange each expects its interests to be satisfied (by inducements)”.
Brenner, 1993	“having some legitimate, non-trivial relationship with an organization (such as) exchange transactions, action impacts, and moral responsibilities.
Carroll, 1993	“asserts to have one or more of these kinds of stakes in the business” – may be affected or affect by corporate activities.
Freeman, 1994	Participants in “the human process of value creation”.
Wicks et al., 1994	“interact with and give meaning and definition to the corporation”.

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Langtry, 1994	“the firm is significantly responsible for their well-being, or they hold a moral or legal claim on the firm”.
Starik, 1994	“can or are making their stakes known” – “are or might be influenced by, or are or potentially are influencers or some organization”.
Clarkson, 1994	“bear some form of risk as a result of having invested some form of capital, human or financial, something of value, in a firm” or “are placed at risk as a result of a firm’s activities”.
Clarkson, 1995	“have, or claim, ownership, rights, or interests in a corporation and its activities”.
Nasi, 1995	“interact with the firm and thus make its operation possible”.
Brenner, 1995	“do or which impact or be impacted by the firm/organization”.
Donaldson and Preston, 1995	“persons or groups with legitimate interests in procedural and/or substantive aspects of corporate activity”.

Source: Mitchell, Agle, and Wood (1997)

### **Multi-dimensional approach**

Based on the nature of the stakeholder-enterprise contractual relationship, Charkham (1992) divides stakeholders into contractual stakeholders, including shareholders, employees, customers, distributors, suppliers, and creditors and community stakeholders consisting of all consumers, regulators, government agencies, pressure groups, the media, and local communities. In regard to the way the community takes risks in business operations, Clarkson (1995) divides stakeholders into active stakeholders including shareholders, investors, employees, customers, and suppliers, who invest capitals in the company and bear the risks of the company and passive stakeholders consisting of local communities, government, and the media, who are at risks because of the influence of company actions.

Meanwhile, on the basis of different levels of close relationship between stakeholders and the firm, Clarkson divides stakeholders into primary stakeholders including shareholders, investors, employees, customers, and suppliers and secondary stakeholders such as environmentalists, the media, the academia, and other specific interest groups. Clarkson believes that primary stakeholders are closely related to survival of the enterprise. If these groups are not continuously involved in the operation of the enterprise, the enterprise will cease to exist while the secondary stakeholders do not have a fundamental impact on the survival of the enterprise since they do not directly deal with the enterprise and indirectly affect the operation of the enterprise or are indirectly affected by the enterprise. Wheeler and Maria (1998) introduce social dimension on the basis of Clarkson's research to classify stakeholders into four

categories (See Figure 2-5): first-level social stakeholders include customers, investors, employees, suppliers, and other business partners, who are directly connected with enterprises and participate in business operations; secondary social stakeholders mainly include residents, related enterprises, and other interest groups, who are indirectly linked with enterprises through social activities; first-level non-social stakeholders include the natural environment and future generations of mankind, who directly influence the enterprises without specific connections with personnel of the enterprise; secondary non-social stakeholders refer to non-human species, which indirectly influence the enterprises with no connection with human beings.

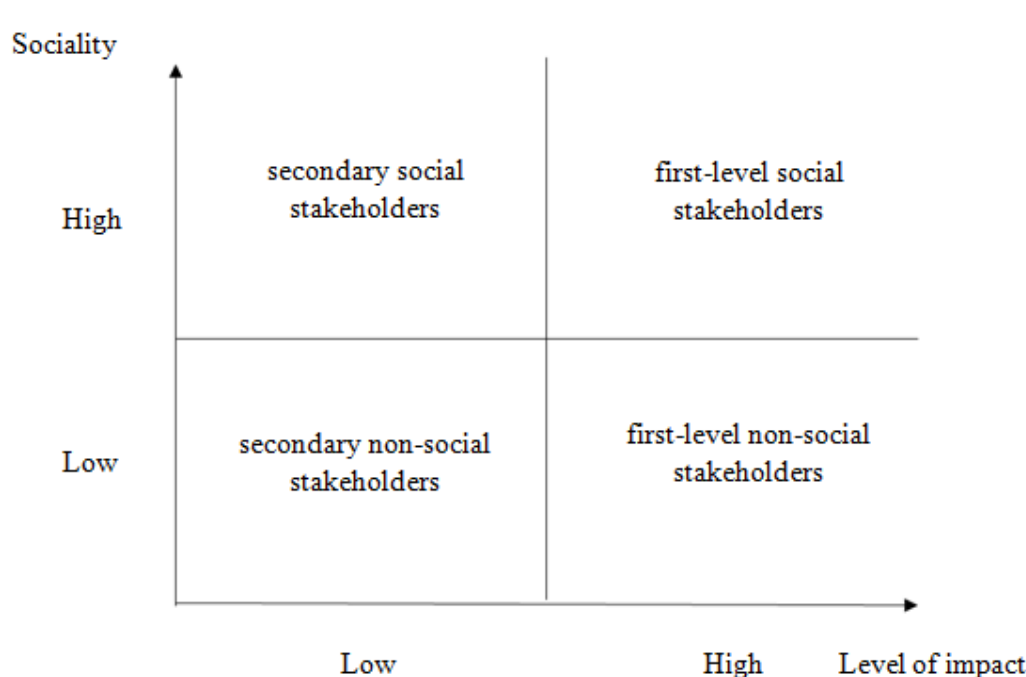


Figure 2-5 Stakeholders classified by sociality

Source: Wheeler and Maria (1998)

### Mitchell score-based approach

Mitchell, Agle, and Wood (1997) propose that corporate stakeholders have three attributes, i.e. power, legitimacy, and urgency. By rating the three attributes, corporate stakeholders are divided into three types: the type of Latent Stakeholder has only one attribute, including Dormant Stakeholder, Discretionary Stakeholder, and Demanding Stakeholder; the type of Expectant Stakeholder has with two attributes, including Dominant Stakeholder, Dependent Stakeholder, and Dangerous Stakeholder; and the type of Definitive Stakeholders have all three attributes (See Figure 2-6).

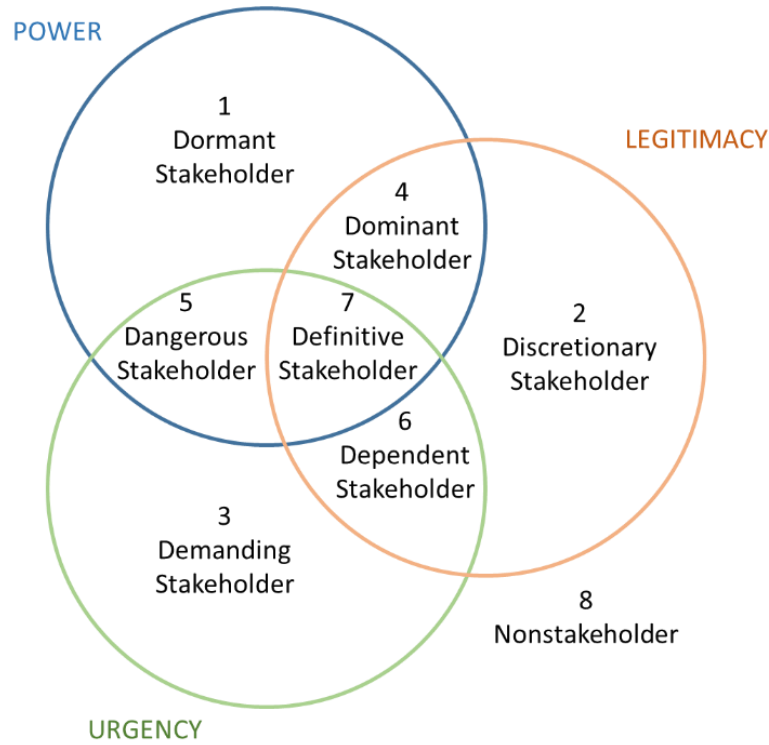


Figure 2-6 Classification of stakeholders

Source: Mitchell, Agle, and Wood (1997)

The Mitchell score-based approach uses the scores of three attributes as indicators to quantify the definition and attribution of stakeholders. This approach is frequently applied to study stakeholders, which promotes the application of stakeholder theory. Against the backdrop of environmental accidents of two mine disasters, Magness (2008) conducts a validation study on the Mitchell score-based approach. He studied the stakeholders' reactions from the perspective of the return and risk of stock, as well as the management's reactions based on the disclosed changes and finds that the reaction time of two groups is different. Agreeing with Mitchell, Agle and Wood, Magness holds that the status of stakeholders is unchangeable. Later scholars have improved the Mitchell score-based approach based on the research of scholars such as Mitchell. In the score-based approach of Mitchell, Agle, and Wood (1997), there are only two values of the stakeholder attributes, i.e. existence or non-existence, and the stakeholders are classified according to the number of attributes obtained by the stakeholders. Jiang and Jin (2009) regard stakeholder attributes as a continuous system with continuous values, and comprehensively scores stakeholder attributes according to the formula

$$S = W_a \times S_a + W_l \times S_l + W_u \times S_u \quad (2.1)$$

Jiang and Jin (2009) subdivide the aforementioned three attributes into five types, i.e. full authority (legal or urgent), authoritative (legal or urgent), general (legal or urgent), not

authoritative (legal or urgent), no authority (legal or urgent), which are assigned consecutively with the score of 100, 80, 50, 20, and 0. The following four special cases calculated by this method are consistent with the types proposed by Mitchell, Agle and Wood: 1. not the stakeholder of the enterprise (with three 0 scores); 2. latent stakeholder (with two 0 scores), which includes dormant stakeholder (power score is not 0), independent stakeholder (legitimacy score is not 0), and demanding stakeholder (urgency score is 0); 3. expectant stakeholder (with only one 0 score), which includes dependent stakeholder (power score is 0), dangerous stakeholder (legitimacy score is 0), and dominant stakeholder (urgency score is 0). Dependent stakeholders rely on others to realize their own interests while dangerous stakeholders have the urge to use their power to achieve their own purposes and put the enterprise at risk and dominant stakeholders have the power to realize their interests; 4. definitive stakeholder (with three 100 scores). Enterprises need to prioritize the interests of such stakeholders. Based on the above results, later scholars divide three attributes of stakeholders into three levels which are assigned with the score of 0, 50, and 100 respectively and the final scores are weighted. The first third with highest scores is defined as key stakeholder or core stakeholder, the last third with lowest scores is regarded as marginal stakeholder or latent stakeholder, and the middle third is considered as general stakeholder or expectant stakeholder (Hu, 2007; Sun, 2017). Crane and Ruebotton (2011) put forward an adaptation to Stakeholder Theory, namely, stakeholders are conceptualized according to their social recognition. Crane and Ruebotton suggest researchers studying organization stakeholders based on social recognition, which is the foundation of organizational cohesion, changes and actions, as far as they are concerned.

### **2.3.4 The application of stakeholder theory in medical and healthcare industry**

Since the 1990s, Stakeholder Theory has been widely applied in the healthcare industry, which makes it more objective and comprehensive to consider the perceptions, positions, and demands of policy-related stakeholder communities in formulating and revising healthcare policies, so as to improve policy feasibility and reduce resistance in policy implementation (Wang, Yang, & Huang, 2006). The application of Stakeholder Theory in the healthcare industry mainly includes healthcare services, medical system reform, drug regulation, and insurance policy implementation.

#### **Healthcare services**

Sun et al. (2015) define the vertical integration of internal and external stakeholders in

urban and rural healthcare service systems, and analyzes the game behaviors among them. These scholars also define three core stakeholders which are internally linked, i.e. medical service providers at all levels, medical workers within medical service institutions, and administrators of medical service institutions; and five core stakeholders which are externally related, i.e. competitors, local residents and patients, government and its health administration, medical insurance institutions, and pharmaceuticals and equipment suppliers. He (2011) explores effective ways to improve the efficiency and effectiveness of community healthcare services through game analysis of various interest groups such as government, service agencies, service personnel, and service targets involved in urban community healthcare service activities.

### **Medical system**

Ma, Xue, and Xu (2014), based on Stakeholder Theory, analyze the respective responsibilities of various stakeholders (government, medical institutions, patients, and their families) in the implementation of two-way referral, propose corresponding improvement suggestions and mechanisms for such issues as impeded information sharing in the referral, difficulty to obtain drugs, obstacles in medical expenses reimbursement, and poor quality of community medical services.

Lei and Dong (2015) believe that the two-way referral system involves five stakeholder groups, i.e. patients or residents, community healthcare service institutions, general or specialized hospitals, health administrative agencies, and social security administrations. The two scholars analyze the relationship among various components of the community healthcare service system in combination with systems theory, build the system dynamics model, and propose suggestions for improving the efficiency of community healthcare services according to the needs of various stakeholders. Zhou, Liu, and Lian (2014) use Stakeholder Theory to analyze the pros and cons of physicians' multi-point practice. According to the research results, it is recommended to continuously improve law and regulation supervision over physicians' multi-point practice, strengthen the construction of medical ethics, continue to deepen reform of the medical and healthcare system, and promote new management models for hospitals.

### **Drug regulation**

Ren et al. (2016), based on the basic drug system practiced in community medical institutions, analyze the game behaviors among stakeholders and recommend to strengthen the leading role of the government and role as safety net of community healthcare services institutions, so as to promote the balance of interests in basic community drug systems. Shang (2010) also analyzes the game among various stakeholders in the basic drug system and points



out that in order to ensure the sustainable development of the basic drug system, it is necessary to pay attention to the role of the media and introduce the interest-compatible mechanism and the principle of good governance.

### **Insurance policy**

Abihiro and Di McIntyre (2013) analyze the feasibility of the development and implementation of the one-time premium payment policy (OTPP) in Ghana, pointing out that many powerful stakeholders are not clear of their own policy stance and influence. The two scholars express their concern on issues such as the significance, affordability, funding sources, policy sustainability, and impact of policy implementation on the fair accessibility of healthcare of OTPP policy under the National Insurance Plan and propose that the next steps should be promoted and implemented under the premise of fully considering the interests of all parties and explaining the policy significance and funding sources to all stakeholders. Onoka, Hanson, and Hanefeld (2015) analyze the national health insurance policy of Nigeria and emphasize that policymakers should carefully guide policy formulation and pay sufficient attention to the health of the whole population, speed up the implementation of the policies, and attach significance to reviewing the stakeholder analysis on a regular basis.

Scholars inside and outside China have widely applied Stakeholder Theory to the healthcare industry and have provided valuable suggestions for the formulation and implementation of healthcare policies, medical system reform, and insurance system reform. However, compared with studies outside China, Chinese research is at a more superficial level. It is necessary to further adopt various qualitative and quantitative methods combined with the multidisciplinary theories and practical problems in the medical and healthcare industry, conduct in-depth analysis, and put forward corresponding suggestions.

### **2.3.5 Summary**

During the development of Stakeholder Theory, scholars represented by Milton Friedman, Michael Jensen, and Michael Porter are considered as opponents of Stakeholder Theory. Friedman (Friedman, 1970) supports the idea of maximizing profits. He believes that from the perspective of enterprise's long-term interests, employers will provide convenient facilities to the community or improve community management. However, these implementations cannot be regarded as social responsibilities but activities enterprises use its resources to enhance corporate profits under the premise of complying with relevant regulations, which are out of the interests of the enterprises. Jensen (2002) argues that Stakeholder Theory does not answer

the questions of how companies maintain to make profits and how to judge the strengths and weaknesses of business operations. He believes that Stakeholder Theory needs to adopt the objective function of “value maximization”. Porter (1980) put strategic competition at the core of business management and believed that favorable competitive solutions could be developed by comparing the value chain administrators of competitors (Porter, 1985). Porter has later incorporated the Stakeholder Theory in his works. Freeman believes that these studies are actually compatible with the main ideas of Stakeholder Theory (Freeman et al., 2010).

Countries that started to apply Stakeholder Theory to policy formulation and risk assessment earlier have deeper understanding of the research and application of this theory. At present, the application of this theory in these countries mainly focuses on factors affecting stakeholder participation, how to make stakeholders get involved in the relevant fields, and how to improve the corresponding system to balance the interests of all parties. English (2000) views that when it comes to environmental issues, stakeholders fail to participate in decision making on environmental risks in an equal way. The stakeholders’ capabilities depend on space and time as well as stakeholders’ types. If there are short-term risks existing in the environmental issues in a certain region, all stakeholders should take part in the decision-making process; but if the risks scatter, stakeholders can only be consulted to the smallest extent because they are scattered and are large in quantity. China started relatively late to study Stakeholder Theory and is still at the development stage. Therefore, studies of Stakeholder Theory in China mainly focus on using questionnaires and interviews to identify and classify stakeholders and exploring stakeholder awareness as well as participation. Policy formulation remains at the level of general direction and there is a shortage of specific and sound systems to promote policy implementation. The application of Stakeholder Theory remains at the instrumental level.

It can be seen from the aforementioned research that China is a country with a powerful government and weak market, and the government plays a dominant role in the formulation and implementation of policies in various fields. Although scholars have studied the prospects of the application of Stakeholder Theory in many fields in recent years, Stakeholder Theory has not been frequently applied in actual management, and there is a lack of relevant supporting policies and perfect implementation plans. It is worth noting that it is difficult to explain external changes since they are new groups, events, and problems leading to uncertainty. External changes can also be new groups or reorganizations of existing secondary relationships, which need to be included in the research as soon as possible (Freeman, 1984). At present, a majority of studies in China does not investigate potential stakeholders thoroughly and mostly

remains focusing on the impact and demands of core stakeholders. To achieve the common governance of stakeholders, it is necessary to attach importance to and analyze the impact of various stakeholders, pay sufficient attention to the impact of non-core stakeholders, strengthen the participation of stakeholders, and formulate relevant policies to guarantee and supervise the implementation of common governance.

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## **Chapter 3: Research Background**

China's tiered diagnosis and treatment has been implemented for over a decade. From the central government to local governments, governments at all levels have successively promulgated corresponding policies to promote tiered diagnosis and treatment. However, its implementation has always been unsatisfactory with much effort but little effect.

### **3.1 Classification and functional positioning of medical institutions and sequence of tiered treatment in China**

Hospitals in China are classified into three classes and ten grades: primary class, secondary class and tertiary class, and each class has grade A, grade B and grade C hospitals, and there is top grade in tertiary hospitals. The functional positioning of medical institutions of all classes and grades is clearly identified in the *Guiding Opinions of General Office of the State Council on Promoting Tiered Diagnosis and Treatment* issued on September 11, 2015. In China, patients can choose to visit medical institutions of any class and grade, and the government does not force patients to take the sequence of tiered diagnosis and treatment. The functional positioning of medical institutions and sequence of tiered treatment is shown as the Figure 3-1.

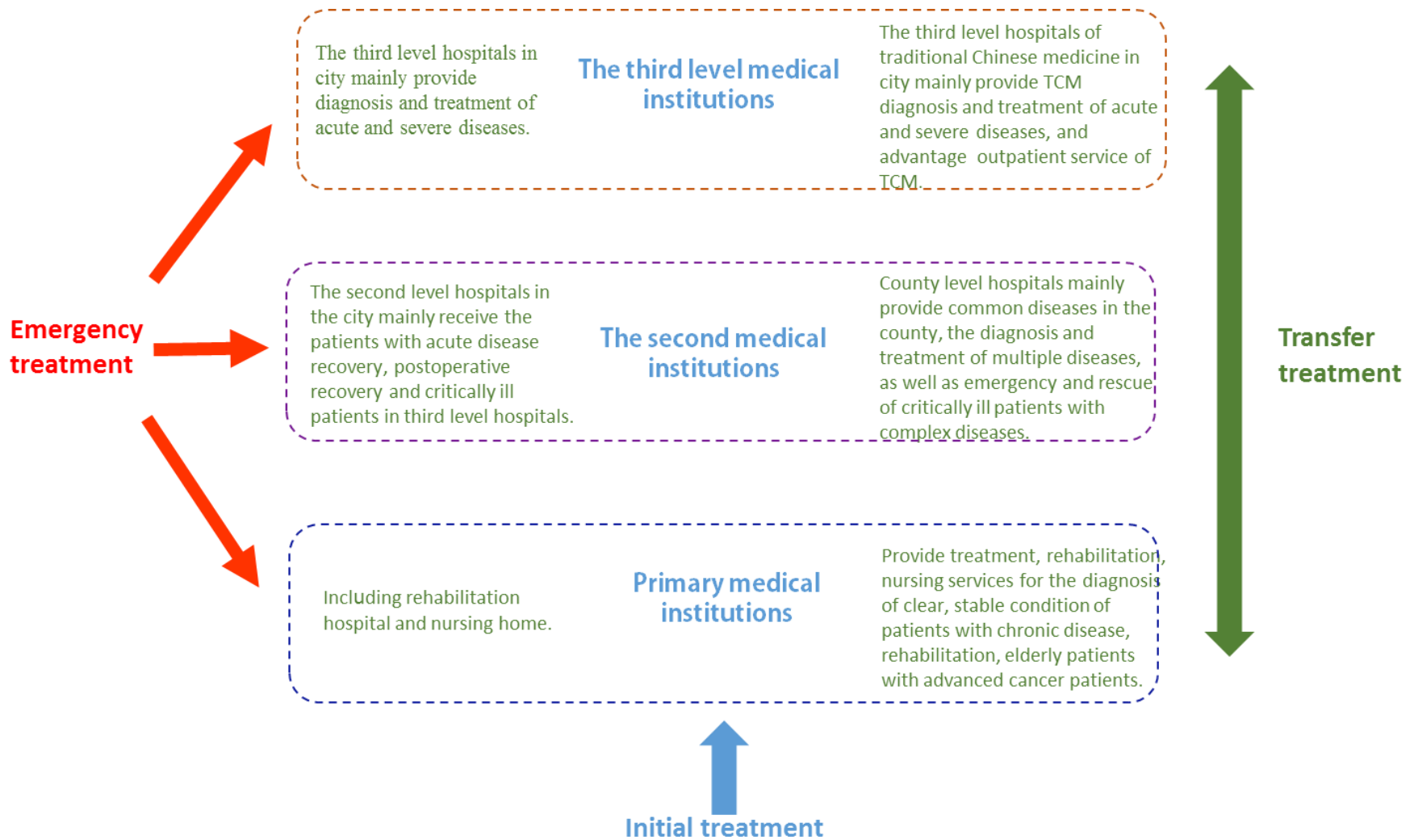


Figure 3-1 Functional positioning of medical institutions and sequence of tiered treatment

Source: General Office of the State Council of PRC (2015b)

### 3.2 Progress of tiered diagnosis and treatment in China

Since the State Council of the People's Republic of China first put forward tiered diagnosis and treatment, governments at all levels have successively promulgated corresponding policies to promote its implementation. Particularly, since 2015, the government has attached great importance to the progress of tiered diagnosis and treatment, and thus made clear requirements on methods to develop tiered diagnosis and treatment, and the time of implementation. The specific policies are shown as follows (See Appendix 1, Table 1). Until now, although the tiered diagnosis and treatment has been implemented for such a long period, most medical resources are still occupied by large hospitals. By the end of May 2018, there were 996,000 medical institutions across the country, including 32,000 hospitals. There were 942,000 primary-level medical institutions, including 35,000 community health service centers (stations), 37,000 township hospitals, 633,000 village medical rooms, and 218,000 clinics.

There were 20,000 professional public health institutions, including 3,463 disease prevention and control centers, and 3,150 health inspection centers. There were 8.03 million medical staff, including 3 million practicing physicians and assistant practicing physicians as well as 3.28 million registered nurses. There were 7.08 million beds in the medical institutions, among which there are 5.34 million beds in hospitals, accounting for 83%, and 1.21 million beds in township hospitals, accounting for only 17% (National Bureau of Statistics of the PRC , 2018 ).

Since the implementation of the tiered diagnosis and treatment, there has been no significant improvement in the flow of patients. In May 2018, the total number of visits to medical institutions in China reached 700 million patients, with a year-on-year increase of 4.2%. The total number of visits to hospitals reached 310 million, increasing by 7.5% on a yearly basis. To be specific, compared with the same period last year, public hospitals took up 260 million, with an increase of 6.0%; private hospitals 40 million, with an increase of 17.6%; primary-level health care institutions 370 million, with an increase of 1.5%; community health service centers (stations) 60 million, with an increase of 7.6%; township hospital 90 million, with an increase of 0.9% (National Bureau of Statistics of the PRC, 2018) . The data show that the growth of patient visits to hospitals is faster than that of the primary-level health care institutions, and the patients still prefer high-level hospitals. It is necessary to speed up the promotion of tiered diagnosis and treatment, and implement the treatment mode featuring initial diagnosis at the grassroots level, interconnectivity between high-level and low-level medical institutions, and

differentiation between treatment of acute and chronic diseases (Health Commission of Tianchang City, 2016b).

### 3.3 Current situation of tiered diagnosis and treatment in Nanjing

Regarding the current Situation of Tiered Diagnosis and Treatment in Nanjing, we will first present a regional overview, the major health issues, the current situation of medical resource allocation and the major problems faced by Nanjing in Implementation of Tiered Diagnosis and Treatment System.

#### 3.3.1 Regional overview

As a sub-provincial city and capital of Jiangsu Province, Nanjing is the political, economic, science and education and culture center. It is an important regional center in the Yangtze River delta economic zone and important transportation junction and communication center. It has 11 districts of Xuanwu, Qinhuai, Jianye, Gulou, Yuhuatai, Qixia, Jiangning, Pukou, Liuhe, Lishui and Gaochun (see Figure 3-2), including 81 sub-districts and 19 towns. It covers an area of 6,587.02 square kilometers and permanent population had reached 8.2359 million by the end of 2015, among which 81.4% were permanent residents in cities and towns. The economic development mode has entered an industrialization period, but there are regional imbalances. Due to historic, geographic and transportation factors, economic development in Jiangning District, Pukou District, Liuhe District, Gaochun District and Lishui District is still relatively backward.

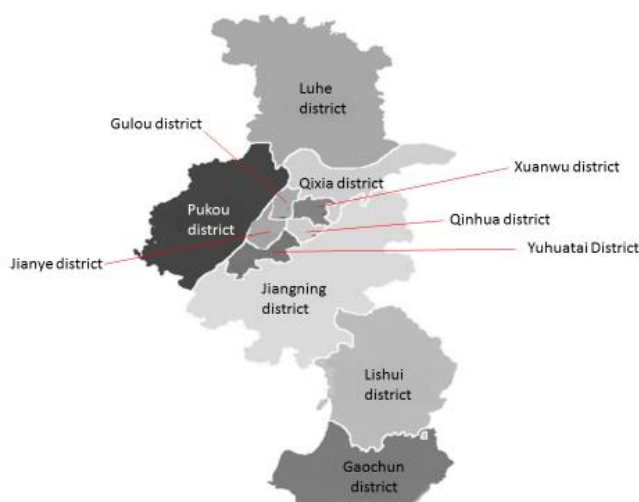


Figure 3-2 Administrative map of Nanjing

Source: Nanjing Government Website



### **3.3.2 Major health issues**

In 2014, the patients admitted by hospitals run by the government were mostly over 60 years old (42.2%) with 24.2% between 45-59 years old, 26.9% between 15-44 years old, 1.8% between 5-14 years old and 4.8% under 5 years old (Nanjing Health Yearbook Editorial Board, 2015). Indicated by the data in Nanjing Health Yearbook (2017), in 2016, the first cause of death in Nanjing was circulation system disease, followed by tumour; the first cause of death by single disease was cerebrovascular disease, followed by heart disease. As affected by the high degree of population aging in Nanjing, the residents have greater demands for prevention and treatment of chronic diseases; meanwhile, the demands for maternal and child healthcare have also increased significantly due to the peak of fertility (Nanjing Health Yearbook Editorial Board, 2017).

### **3.3.3 Current situation of medical resource allocation**

#### **(1) Number of medical institutions**

By the end of 2016, there were 2,383 medical institutions in Nanjing, including 209 hospitals, 491 community health service stations, 124 outpatient clinics, three emergency centers, 14 maternal and children care hospitals, 5 specialized disease hospitals, two sanatoriums, 1,107 clinics and medical rooms and 11 clinical laboratory centers (Editorial Board of the 2017 Yearbook of Nanjing Health, 2017).

#### **(2) Amount of beds**

In 2016, there were altogether 44776 beds in medical institutions in Nanjing. To be more specific, 209 hospitals accounted for 88.5%; 2,051 community medical institutions accounted for 7.8%. There were 7.52 beds for every one thousand persons. Most beds are in hospitals, and the amount of beds among different regions and the amount of beds every one thousand persons are significantly different. Most beds are in main urban areas (Editorial Board of the 2017 Yearbook of Nanjing Health, 2017).

#### **(3) Amount of professional medical workers**

By the end of 2016, there were 70,687 professional medical workers, including 24,035 practicing physicians, 1,237 assistant practicing physicians, 322,093 registered nurses, 3,935 pharmacists, 4,157 technicians, 3,052 medical laboratory technicians, and 5,230 other medical staff. In hospitals, professional medical workers account for 75.3%. The educational background of the medical staff in grassroots medical institutions is significantly lower than

their counterparts in hospitals (Editorial Board of the 2017 Yearbook of Nanjing Health, 2017).

### 3.3.4 Major problems faced by Nanjing in implementation of tiered diagnosis and treatment system

Since 2009, Jiangsu Province and Nanjing has formulated a series of policies (See Appendix 1, Table 2) in terms of management mechanism, personnel system, drug price reform, payment mode and grassroots medical team building to promote implementation of tiered diagnosis and treatment, but the results are not satisfactory. There are still problems in the medical service system as follows.

#### (1) Unreasonable distribution of medical resources

Most medical resources in Nanjing are concentrated in secondary and tertiary medical institutions. The main urban area, especially Gulou District, has significantly more medical resources than other districts, as show in Figure 3-3.

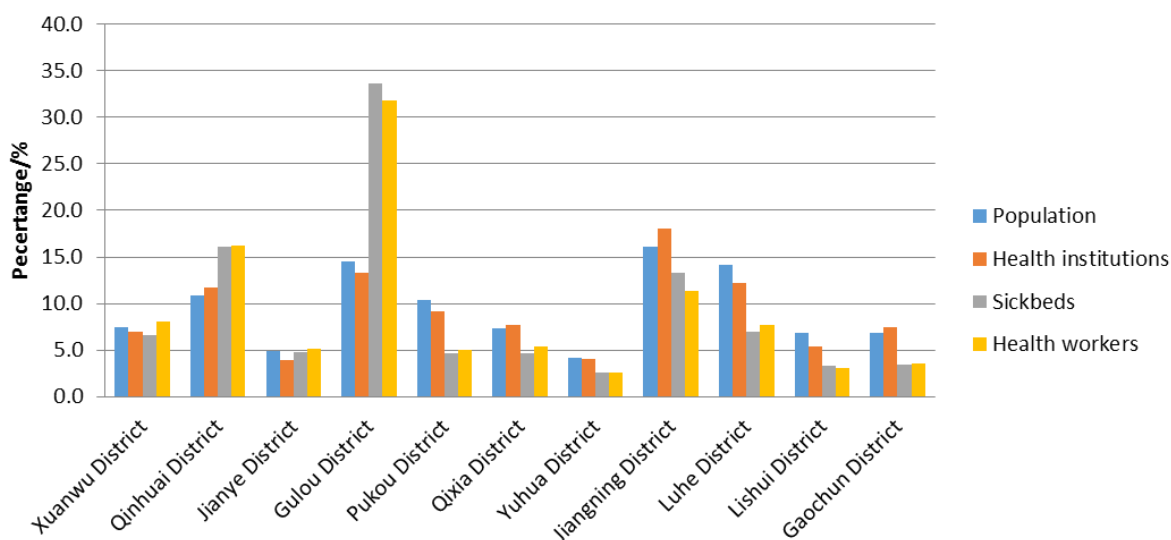


Figure 3-3 Population and medical resources of Nanjing  
 Source: Editorial Board of the Yearbook of Nanjing Health (2017)

#### (2) Unreasonable functional structure of medical institutions and lack of specialized medical resources

As the capital of Jiangsu, Nanjing has abundant medical resources generally speaking and the accessibility of medical resources is high, but the categories and functions of medical institutions still cannot meet public demand for health. With the aging of population, people have an increasing demand for aged care, rehabilitation, and hospice care, but there are only two sanatoriums within the city. In addition, due to the universal two-child policy, there was

another baby boom in 2016, but the pediatrics and gynecology and obstetrics service capacity is insufficient due to shrinking of pediatrics in general hospitals and substantial patients from neighboring provinces.

### (3) Imperfect medical service system with multiple forms

The Nanjing government has been encouraging to open and develop private medical institutions, and the amount of private medical institutions has been on the rise, but most of them are small, low-level and uncompetitive, lacking large scale, influential and distinctive ones.

### (4) Insufficient government investment

In recent years, the government has increased investment on the health industry, but compared with investment on economic and social development, investment on the health industry is still insufficient. Medical business revenue still accounts for a major part in the overall revenue of medical institutions.

### (5) Lack of whole-industry management system of regional medical resources

According to the *Decision of the CPC Central Committee and the State Council on Health Reform and Development* (1997), there should be an overall planning and whole-industry management on the development of regional health care industry. Nanjing has provincial, ministry-level medical institutions, municipal, district-level medical institutions and military medical institutions. There is no whole-industry management system, which affects reasonable allocation of regional medical resources.

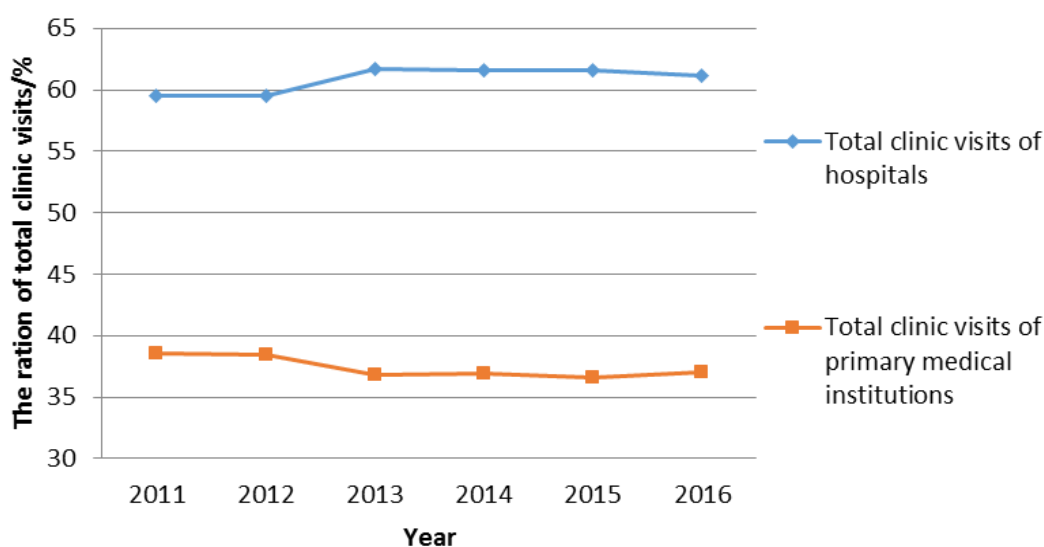


Figure 3-4 Change of patient visits in hospitals and community medical institutions

Source: Editorial Board of Nanjing Health Yearbook (2012-2017)

(6) Unsatisfactory results of tiered diagnosis and treatment and dual referral

According to the *Medial Institutions Planning of Nanjing (2009-2015)* issued by Nanjing Health Bureau (2009), by 2015, Nanjing will have a tiered medical service system in which hospitals and community health service institutions have a reasonable division of labor, pre-hospital emergency system covering the whole city, and a situation in which public hospitals and private hospitals are competitive yet complementary to each other. It is expected that outpatient volume of community medical institutions account for 70% of the total outpatient volume of Nanjing, but data of 2016 showed that the number was only 37.0%, and the outpatient volume of community health service stations accounted for 26.2%, far below the objective (70%) (Editorial Board of Nanjing Health Yearbook, 2017). From 2011 to 2016, less than 5% patients were referred to large hospitals and less than 0.34% patients were referred to community medical institutions (Editorial Board of Nanjing Health Yearbook, 2017) (see Figure 3-4 and Figure 3-5).

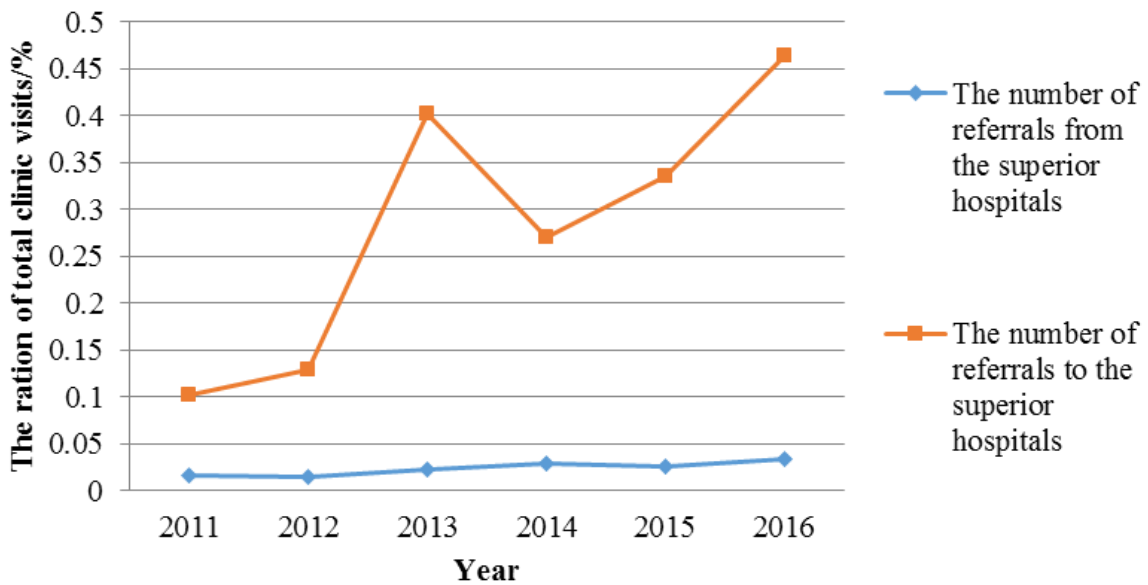


Figure 3-5 Change of dual referral visits

Source: Editorial Board of Nanjing Health Yearbook (2012-2017)

## Chapter 4: Research Method

### 4.1 Research approach

As one of the commonly used methods in management, case study is suitable for in-depth research on intricate specific issues where the objects are not controlled, uncontrollable or in reality (Sun & Zhu, 2004). In case study, researchers can describe and explore a certain phenomenon or thing and seek for the solution. Integrated with a range of methods including questionnaire, interview and literature analysis, case study lays a foundation for project evaluation, strategy management and policy implementation. Currently, China is pushing forward tiered diagnosis and treatment in an all-round way. Against this backdrop, researchers will be confronted with difficulties concerning object size and data collection. Therefore, this study adopts case study to discuss tiered diagnosis and treatment so that it can facilitate material collection, problem discovery and solution raising. As the capital of Jiangsu province, Nanjing features rich medical resources, sophisticated relations among affiliated hospitals and a long period of tiered diagnosis and treatment. During the process of developing tiered diagnosis and treatment in Nanjing, the difficulties and countermeasures are representative within China.

Taking into account what the author wanted to do, we believe the most adequate strategy to follow was the case study strategy. This implied basing our research strategy in the approach presented by Yin (2003).

The case study has been used as a research strategy in several situations in order to help create knowledge of various phenomena. Case studies are usually used to try to understand complex social phenomena and to allow researchers to attain the holistic and meaningful characteristics of real-life events (Yin, 2003).

Also, building theory from case study research is most adequate to new topics or to provide freshness in perspective to an already researched topic (Eisenhradt, 1989)

Taking into consideration the difficulties in tiered diagnosis and treatment, the author decided to study one case to aim for recommendation of measures.

The author chooses Nanjing as the case and, based on the Stakeholder Theory, analyzes the tiered diagnosis and treatment service system according to “current situation → problems

→ measures”. Currently the major form of tiered diagnosis and treatment system in Nanjing is medical partnership. Therefore, the author adopts case study to compare and contrast the constitution, management system and operation mechanism of the three major medical partnerships in Nanjing (Jiangsu Province Hospital Group, Nanjing Drum Tower Hospital Group and Zhongda Hospital Affiliated to Southeast University Group) to explore the similarities and differences and advantages and disadvantages of the three alliances. Literature review method will be used to sum up the major interest groups of tiered diagnosis and treatment. The Mitchell score-based approach will be adopted to determine the attributes of each stakeholder (determined stakeholders, prospective stakeholders or potential stakeholders); then the questionnaires will be adopted to investigate each stakeholder’s recognition, appeals and suggestions in respect of the tiered diagnosis and treatment in Nanjing. The conceptual model of the thesis is shown in the Figure 4-1. On this basis, the dilemma that the implementation of tiered diagnosis and treatment is confronted under the mode of Nanjing medical treatment combination will be summarized to find solutions, propose relevant suggestions, help the implementation of tiered diagnosis and treatment, and provide a reference for similar cities.

## **4.2 Case study of medical treatment combination in Nanjing**

Nanjing promotes the tiered diagnosis and treatment through medical treatment combination. On the basis of analysis of the stakeholder theory while in combination with literature review and field investigation, this research studies the differences and similarities of three representative medical treatment combinations, namely Jiangsu Province Hospital Group, Nanjing Drum Tower Hospital Group and Zhongda Hospital Group Affiliated to Southeast University in terms of their structures, models and recent achievements.

## **4.3 Analysis of key stakeholders**

Upon literature review and expert consultation about stakeholders, we have scored the stakeholders in a comprehensive manner by referring to the Mitchell score-based approach (Mitchell, Agle, & Wood, 1997), Jiang and Jin (2009), Sun (2017) research methodologies to identify the classifications of stakeholders, identify key stakeholders, and analyze the relationship between stakeholders and tiered diagnosis and treatment as well as the relationship among stakeholders.

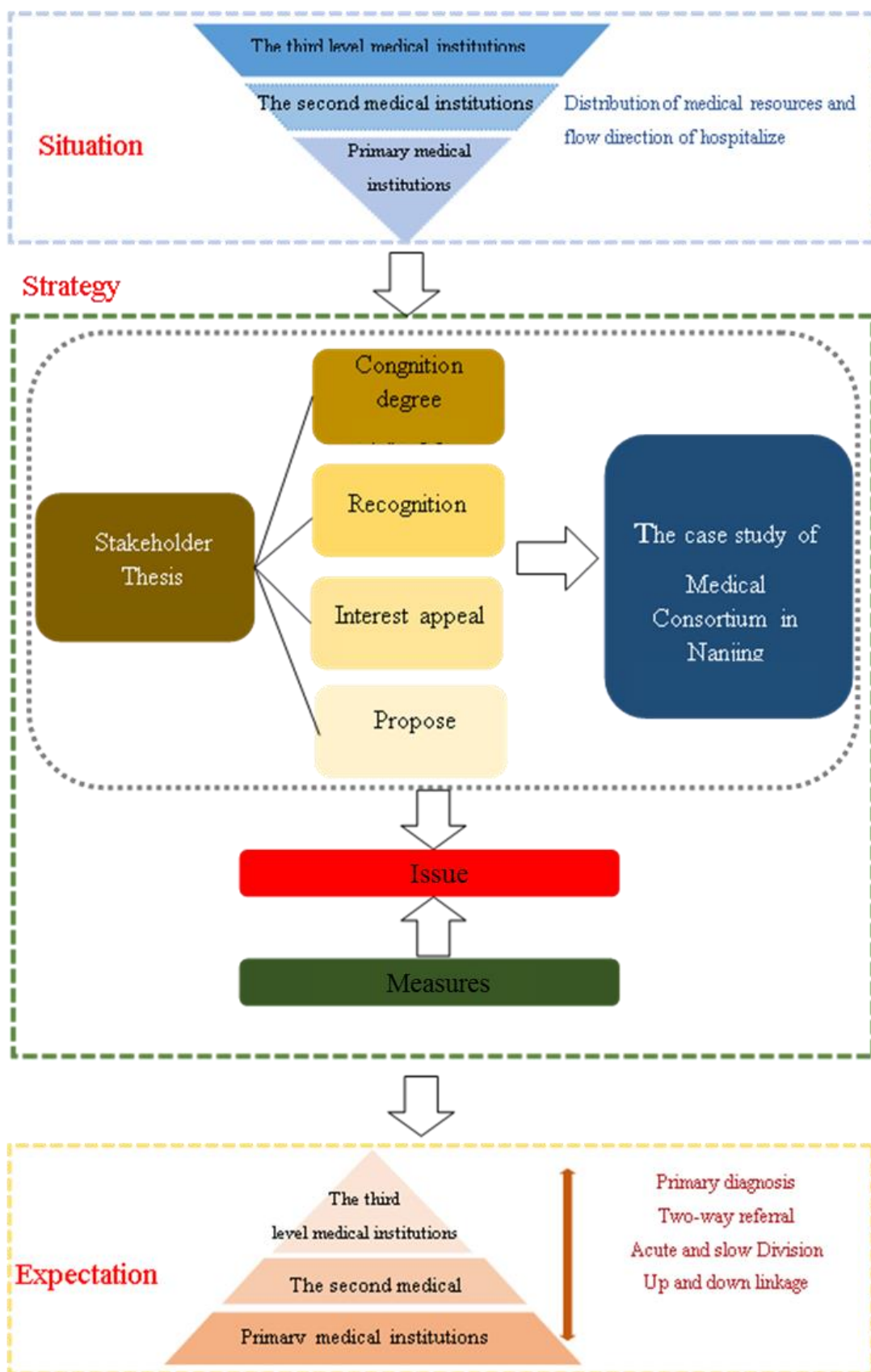


Figure 4-1 Conceptual model of the thesis

### 4.3.1 Identification of stakeholders of tiered diagnosis and treatment

Based on the literature review on stakeholder theory both at home and abroad through China Knowledge Resource Pool (CNKI), Wanfang Data Academic Paper Database, Weipu Chinese Citation Database, PUBMED and Elsevier Journal Full-text Database, we have sorted out the stakeholders engaged in the tiered diagnosis and treatment and prepared the expert consultation form; besides, in the period from August 1<sup>st</sup>, 2017 to January 5<sup>th</sup>, 2018, we have also consulted with a total of 20 experts engaged in tiered diagnosis and treatment at Nanjing health administrative department, the superior medical institutions and the primary healthcare institutions, among others. The experts are selected from the expert pool of the Professional Committee of Hospital Management of Nanjing Medical Association, which is the non-profit social legal person co-founded by medical staff and unit members in Nanjing voluntarily. As for the committee, it consists of directors of the health administration department and the medical insurance department that are responsible for hospital management and research on medical policy, managers of medical organizations and experts from colleges and universities. In this study, representative experts specializing in tiered diagnosis and treatment covering different fields in Nanjing are selected from the expert pool, among which seven are from municipal and district administrative departments, three from medical insurance departments, two from superior medical organizations, three from primary medical organizations and five from colleges and universities.

To be specific, they are Xu Minsheng, Deputy Director of Nanjing Municipal Health Committee. Ding Xiaoping, Deputy Director of Nanjing Municipal Health Committee. Wang Zongyuan, Director of Gulou District Health Committee. Wang Shicheng, Director of Jianye District Health Committee. Wang Liming, Director of Xuanwu District Health Committee. Qiu Feng, Director of Gaochun District Health Committee. Huang Lin, Deputy Director of Qixia District Health Committee. Xia Haiming, Deputy Director General of Nanjing Municipal Office of Medical Insurance. Xia Xi, Deputy Director of Nanjing Municipal Center for Medical Insurance Settlement. Tan Chaoming, Chief of Services Section of Nanjing Municipal Center for Medical Insurance. Chen Deqiao, Deputy Superintendent of Nanjing Maternity and Child Health Care Hospital. Zhou Nan, Deputy Superintendent of Nanjing Stomatological Hospital. Wu Qiang, Director of Center for Health Services of Maigaoqiao Community, Qixia District, Nanjing. Ding Guoqiang, Director of Center for Health Services of Mufushan Community, Gulou District, Nanjing. Chen Dong, Director of Center for Health Services of Shangshu Community, Qinhuai District, Nanjing. Liu Baorui, Deputy Superintendent of Nanjing Drum



Tower Hospital, the Affiliated Hospital of Nanjing University Medical School. Jing Kangzhen, Director of the Department of Medical Affairs of Nanjing Drum Tower Hospital (the Affiliated Hospital of Nanjing University Medical School). Chen Ming, Deputy Superintendent of Zhongda Hospital (the Affiliated Hospital of Southeast University). Zhu Gen, Deputy Superintendent of the First Affiliated Hospital with Nanjing Medical University. Ma Chaoxian, Deputy Superintendent of the Affiliated Hospital of Nanjing University of Chinese Medicine. In this study, experts with over 50% supporting rates are considered as stakeholders engaged in the tiered diagnosis and treatment. See Appendix 2, Table 1 and Table 2 for the specific Consultation Form.

#### 4.3.2 Categorization of stakeholders engaged in tiered diagnosis and treatment

According to the results of the consultation form, experts are invited to classify the stakeholders from three perspectives (See Appendix 2, Table 3): authority, legitimacy and urgency and rank the stakeholders to such three grades as weak, normal and strong, scored as 0, 50 and 100 respectively. The calculation formula is shown as follows:

$$S=Wa \times Sa+Wl \times Sl+Wu \times Su \quad (4.1)$$

S represents the comprehensive score. Wa, Wl and Wu signify the weight of authority, legitimacy and urgency respectively. Sa, Sl and Su refer to the score of authority, legitimacy and urgency respectively. Based on their weight scores, the first one third stakeholders are categorized as key stakeholders (core stakeholders) and the final one third stakeholders are categorized as marginal stakeholders (potential stakeholders) with those in between as general stakeholders (the prospective stakeholders) (Hu, 2007; Sun, 2017).

The weight value is shown as follows: (1) if the weight of authority, legitimacy and urgency has the same score, accounting for 1/3 respectively; (2) if one of such three weight values is 0, then such item weighs 100% with the other two items weighed 0; (3) if all these three weight scores are higher than 0 with one of 20, the general weight of the item with the value of 20 is 80% while the other two weighed 20% in total; (4) if all these three weight scores are higher than 20 with one higher than 50, the general weight of the item with the value of 50 weighs 70% while the other two weigh 30% in total; if all these three weight scores are higher than 50, each item weighs 1/3 (Sun, 2017).

#### **4.4 Cognition, interest demands and suggestions of core stakeholders concerning tiered diagnosis and treatment**

According to the definition and classification of stakeholders, the cognition, recognition, interest demands and suggestions of core stakeholders concerning tiered diagnosis and treatment have been explored through questionnaire survey. 200 *Questionnaires for Government Staff* (See Appendix 3) have been distributed to government departments in total with 200 *Questionnaires for Superior Medical Institutions* (See Appendix 4) to medical staff in superior institutions (including second-level, specialized and tertiary hospitals), 200 *Questionnaires for Staff in Primary Medical Institutions* (See Appendix 5) to grassroots medical staff in three major medical treatment combinations, 200 *Public Questionnaire* (See Appendix 6) to Nanjing citizens (including patients, dependents of patients and residents) and 200 *Questionnaires for Enterprise's Employees* (See Appendix 7) to employees in companies. See appendix.

#### **4.5 Data processing**

EPIDATA3.0 was used for data entry, the data was entered by two persons and processed by error processing, and the SPSS 24.0 was used for data processing.

## **Chapter 5: Results**

### **5.1 Comparison of three major medical treatment combinations**

#### **5.1.1 Jiangsu province hospital group**

##### **(1) Basic conditions**

Jiangsu Province Hospital Group was established in 2004 upon approval of Jiangsu Provincial Health Department. It is composed of Jiangsu Province Hospital, Jiangsu Women and Children Health Hospital and Jiangsu Province Official Hospital according to the principle of "resources sharing, complementation of mutual advantages, intensification of their specialties, best utilization of their talents, independent operation and win-win situation" (Jiangsu Health Department, 2004). Up to now, the medical treatment combination of Jiangsu Province Hospital includes Jiangsu Province Hospital, Jiangsu Women and Children Health Hospital, Jiangsu Province Official Hospital, Donghai People's Hospital, No. 6 People's Hospital of Xuzhou, Sheyang County People's Hospital, Huaiyin Hospital, Siyang County People's Hospital, Xinghua City People's Hospital, Liyang City People's Hospital, Shuyang People's Hospital, Shuyang Hospital of Traditional Chinese Medicine, Hexian Hospital of Traditional Chinese Medicine, the First People's Hospital of Kunshan, Mingguang People's Hospital, Tianchang People's Hospital, Jiangyan Hospital of Traditional Chinese Medicine and 15 Community Health Service Centres (Stations). As the core of the medical treatment combination, Jiangsu Province Hospital is a Grade-III Level-A General Hospital integrating medical treatment, teaching and scientific research. It covers a construction area of 410,000 m<sup>2</sup> with the total fixed asset of RMB 2.4 billion, 3685 beds available and more than 5,300 employees (Jiangsu Province Hospital, 2018).

##### **(2) Operation & management system**

The Group takes the Jiangsu Province Hospital as its core, relies on its advantages in technology and talents, and takes management, technology and capital as its bonds, the Group carries out various forms of association and cooperation among its members to give full play to its advantages and promote common development. The independent legal person status of the medical treatment combination member units remains unchanged, the asset management and

financial subsidy channels remain unchanged, and the administrative affiliation remains unchanged, and the Group Council is the Group's management organization and is responsible for the decision-making and management of the Group's major issues. The Council is the highest decision-making body of the Group and is composed of representatives of the member units of the Group. Each term of office is four years and its members can be re-elected. The Council director are appointed. In principle, all member units can appoint one director. The Council shall have one chairman and three to four vice-chairmen. The chairman shall be the legal representative of the provincial People's Hospital, while the vice-chairmen shall be the legal representative of the Jiangsu Women and Children Health Hospital and Jiangsu Province Official Hospital and the Provincial People's Hospital respectively. The chairman shall preside over the work of the Council, while the vice-chairman assists the chairman in his work. The Council has a Group office. The office has a director, whose candidate is nominated by the Jiangsu Province Hospital and decided by the Council. The Council is responsible for formulating the rules of procedure and working system of the Council, coordinating and organizing the implementation of Group affairs and resolutions made by the Council, being responsible for overall arrangement of the Group's operation mode and personnel management (Jiangsu Health Department, 2004).

Each year, Jiangsu Province Hospital sends medical personnel to carry out outpatient service, teaching rounds, surgical teaching, academic lectures and promotion of new technologies and new projects in the member units of the medical treatment combination. It constructs five major mechanisms in the medical treatment combination, including an orderly referral mechanism for difficult and complicated cases, a convenient service mechanism for experts to community institutions, rehabilitation in the community mechanism, the promotion and training mechanism for grassroots medical workers, and medical brand output mechanism. It actively promotes the establishment of a long-acting working mechanism of the medical treatment combination and implements two modes of "send down, pick up" and "two-way docking". "Send down" means sending medical personnel to serve at the grass-roots level, and "pick up" means giving priority to the technical backbone of the assisted institutions to go to our hospital for further training. The "two-way docking" mode is a comprehensive and continuous service mode established between the Hospital and Nanjing Community Health Service Institutions, which includes two-way referral, technical support, management influence, linkage development and many other contents. It promotes the improvement of medical quality and management quality of member units and alleviates the problem of difficulty and expensive

in seeing a doctor at the grassroots level.

### (3) Achievements

In 2017, 22 batches of 158 person-time grassroots medical services were arranged. All medical personnel can work earnestly in grass-roots hospitals, actively assist local hospitals in developing new technologies, participate in outpatient clinics, ward rounds, surgery, organize lectures, and carry out the new technologies and new projects in grass-roots medical institutions. More than 300 operations were carried out and directed, with a total number of about 30,000 people diagnosed and treated (Jiangsu Province Hospital, 2018).

## **5.1.2 Nanjing drum tower hospital group**

### (1) Basic conditions

Nanjing Drum Tower Hospital Group includes four units: Nanjing Drum Tower Hospital, Nanjing Children's Hospital, Nanjing Stomatology Hospital and Nanjing Chest Hospital. Upon operation as a loose group for eight years, it was officially approved by Nanjing Government as an independent legal enterprise entity in July 2005 and implemented the administrative responsibility system under the leadership of the board of directors (Hao, 2007).

At present, members of the Group include Nanjing Drum Tower Hospital, Nanjing Children's Hospital, Nanjing Stomatology Hospital, Nanjing Chest Hospital, Suqian People's Hospital, Nanjing Drum Tower Hospital Liuhe Branch, Nanjing Drum Tower Hospital Gaochun Branch, Shanghai Meishan Metallurgical Staff Hospital, Yizheng Hospital, Anqing Hospital, Xianlin Drum Tower Hospital, First People's Hospital of Chuzhou, Ma' Anshan Xiushan Hospital, Drum Tower Hospital Management Company, Golden Drum Hospital Management Company, Nanjing Gaoxin Hospital, Jiangning Rehabilitation Hospital.

The medical treatment combination of Nanjing Drum Tower Hospital also includes three community health service centres under the jurisdiction of Drum Tower District of Nanjing: Xiaoshi, Hunan Road and Jiangning Road, 8 central health hospitals in Gaochun District and 16 social health service centres in Liuhe District.

Nanjing Drum Tower Hospital is the core hospital of the medical treatment combination. It is a large-scale Grade III Level A General Hospital integrating medical treatment combination, teaching and scientific research with 3,000 approved beds and more than 5,600 employees (Nanjing Drum Tower Hospital Group, 2018). The member units of the medical treatment combination include Grade-III Level-A Specialized Hospitals, Grade-III General Hospitals,

Grade-II General Hospitals and grassroots medical institutions.

(2) Operation and management system

Nanjing Drum Tower Hospital Group is an independent legal enterprise entity. Gaochun Branch, Liuhe Branch and other units of "Cooperation between the Hospital and Government" are guided by the operation and management of Drum Tower Hospital under the condition that the nature of the unit, the ownership of assets and the management structure remain unchanged. Medical institutions joining the Group with technology and management as bonds maintaining the original independent legal person status, asset ownership and management structure unchanged. The board of directors is highest decision-making body of Group, and exercising decision-making power over major issues in the Group's operations, important personnel appointment and removal, the Group's development strategic planning, performance management etc. The board of supervisors, as the Group's internal supervision organization, is responsible for supervising the use of the power of the board of directors. The management of the Group consists of Chairman, Dean-in-Charge and Chief Accountant etc. Among them, the chairman of the board as the legal representative of the Group, is responsible for implementing the decision of the board of directors and the specific operation and management of the Group.

By subdividing the medical service market and optimizing the allocation of resources, the Group can revitalize its assets, share resources and complement mutual advantages; play scale benefits through intensive operation to improve competitiveness and promote multidisciplinary cooperation between different hospitals; promote academic innovation and medical development, and strengthen the overall medical and health service system of chain operation between hospitals and community health service stations. Nanjing Drum Tower Hospital actively promotes the "node-to-surface" mode under the "cooperation between the hospital and the government". It has successively established longitudinal medical resource integration with the government of Liuhe District, the Grade-II Hospital of Gaochun District government and several grassroots medical and health institutions thereunder, innovated the branch mode, exported technical services such as tele-consultation, remote imaging diagnosis, remote electrocardiogram diagnosis, remote examination and pathology diagnosis, and remote training to grassroots medical and health institutions, explored the effective mode of "grassroots examination and Drum Tower diagnosis", established diagnosis and treatment sub-centres, realized inter-hospital collaborative services such as resource sharing, tiered diagnosis and treatment, and improved the overall level and circulation capacity of specialized subjects. Drum Tower Hospital dispatches management teams to the members of the close medical treatment

combination to serve as vice-presidents and department directors, and implants the cultural concept of Drum Tower Hospital, directly participate in the management at the hospital level, and help improve the overall level of functional departments and clinical departments. And dispatches experts to the community health service centre and other loose medical treatment combination member units to take part in outpatient service, ward rounds and teaching.

### (3) Achievements

In 2017, Drum Tower Hospital dispatched 143 doctors from the medical treatment combination, served 4,071 days, conducted 850 rounds of expert rounds and 200 operations, and received 35 people to study in the hospital under the condition of preferential treatment. Since the establishment of the Digestive Sub-center of Gaochun Branch, the annual outpatient service volume of digestive specialty has increased by 27.6% compared with that in 2015, the workload of endoscopy room has increased by 13.8%, the business income has increased by 13.4 %, the workload of gastroscopy has increased by 13.2%, the early cancer detection rate has improved by 8.2%, the workload of enteroscopy has increased by 25.4%, and the workload of ERCP has increased by 77.8% (Nanjing Drum Tower Hospital Group, 2017). In February 2018, Gaochun Branch was awarded the third-grade hospital of Jiangsu Provincial Health and Family Planning Commission (Bai, 2018).

## **5.1.3 Zhongda hospital southeast university group**

### (1) Basic conditions

Zhongda Hospital Southeast University Group was established in August 2015. By the end of 2017, the "private customization" pattern of Zhongda Hospital's medical treatment combination had driven the development of 53 group hospitals. With Zhongda Hospital Southeast University as the core, the member units of Zhongda Hospital's medical treatment combination are spread across Jiangsu and Anhui provinces. It is mainly composed of the Grade II Level A Hospitals in the three-hour traffic circle around Nanjing, and also includes some Grade III Hospitals, rehabilitation hospitals with medical support as well as community health service centres. Zhongda Hospital is the affiliated hospital of Southeast University---one of the 985 Project Universities directly under the jurisdiction Ministry of Education. Also, it is the only university affiliated hospital under the key building of 985 and 211 Projects directly under the jurisdiction Ministry of Education in Jiangsu province. Furthermore, it is also the first comprehensive Grade-III Level-A Hospital in Jiangsu province that has passed the evaluation of the Ministry of Health. At the same time, it is also a large-scale comprehensive teaching

hospital that integrates medical treatment, teaching and scientific research. Its member hospitals were shown in Appendix 8.

### (2) Operation and management system

From the very beginning of the construction of the medical treatment combination of Zhongda Hospital, it was positioned as a voluntary combination under the non-governmental intervention. The individual member units were equal, mutually beneficial, and developed together. They were demand-oriented, supported by information technology, managed by means and linked by technology. The members were insisted on resource sharing, complementary advantages, mutual support, tiered medical care, and common development, and gradually realized the sharing of regional medical resources, the integration of medical technologies, the standardization of medical services, and the informationization of hospital management. The Zhongda Hospital receive free the medical personnel of the member units to take further study and there is no limit to the length of study. Also, Zhongda Hospital opens a remote return certificate, remote education, remote discussion of difficult cases, remote imaging diagnosis, remote pathological diagnosis and two-way referral system to the member units, sets up a two-way referral office, establishes a referral platform such as telephone, WeChat, referral form and network, and dispatches business backbone and hospital management personnel to the member units.

### (3) Achievement

By the end of 2017, Zhongda Hospital had dispatched 8 presidents and vice presidents, 12 clinical directors and 5 nursing directors to 53 group hospitals, established 98 specialized diagnosis and treatment canthers, 25 expert workstations, 49 compact-cooperation departments and 227 loose-cooperation departments (Zhongda Hospital Southeast University Group Office, 2018). Besides, the hospital guided its members to carry out more than 350 new technologies and successfully declare 16 key specialties at all levels (Zhongda Hospital Southeast University Group Office, 2018). In 2016, the medical treatment combination converted 7,088 person-time of all kinds of inpatients, and 12,160 person-time of inpatients were transferred in 2017 (Zhongda Hospital Southeast University Group Office, 2018). Zhongda Hospital was ranked the first in terms of two-way referral among Jiangsu medical treatment combination in 2017 (Zhongda Hospital Southeast University Group Office, 2018).

## 5.1.4 Summary

The three major medical treatment combinations in Nanjing have all been set up in the



form of groups, with large-scale Grade III Level A comprehensive hospital that integrate medical treatment, teaching and scientific research as their core. The core hospitals are respectively the affiliated hospitals of three universities in Nanjing, namely the Jiangsu Province Hospital (The First Affiliated Hospital of Nanjing Medical University), Nanjing Drum Tower Hospital (Drum Tower Hospital Affiliated to Medical College of Nanjing University) and Zhongda Hospital Affiliated to Southwest University. The three hospitals all have several national, provincial and municipal key specialties, and rely on the scientific research platform and scientific research talents of universities to promote the development and application of new medical technologies as well as the perfection and promotion of management system. The three core hospitals are all public welfare hospitals but belong to different superior departments:

- Jiangsu Province Hospital is directly affiliated to the Jiangsu Provincial Health and Family Planning Commission and enjoys the financial support of the Jiangsu provincial government.
- The Nanjing Drum Tower Hospital is directly affiliated to the Nanjing Municipal Health and Family Planning Commission and enjoys the financial support of the Nanjing municipal government.
- Zhongda Hospital is an affiliated hospital of colleges and universities directly under the Ministry of Education and does not enjoy local financial support.

The Nanjing Drum Tower Hospital Group was constructed in 1996, Jiangsu Province Hospital Group was established in 2004, and Zhongda Hospital Group was established in 2015. However, the number of member units of Zhongda Hospital is currently the highest among the three medical treatment combinations. The three medical treatment combination member units are all spread throughout of Jiangsu and Anhui provinces. The internal organization forms of the medical treatment combination are classified into compact and loose types. The compact type refers to hospitals that are appointed to a group under the leadership of the government, with people and property of the hospitals under unified management by the group, and the internal HIS systems of hospitals are connected with each other. The loose type means that hospitals are linked by technical ties based on the principle of voluntary association, and member hospitals reserve the right to manage the people and property without the interference of the group. The government-led hospitals that are owned by the group belong to compact type, with the people and property of the hospitals under unified management by the group, and the internal HIS systems of hospitals are connected with each other, realizing the mode of "general hospital outpatient, branch surgery, rehabilitation" and "treatment and rehabilitation according

to disease sub-centres", promoting patient diversion and increasing the utilization rate of medical resources.

The member hospitals linked by technical ties based on the principle of voluntary combination belong to loose type. Under such mode, the right to manage the people and property of the hospitals remain to the member units and the group does not interfere, the core hospitals and the member units each takes the required cooperation. The core hospitals provide member hospitals with management personnel and medical personnel to help member hospitals to build specialized departments as well as hospital ratings and improve member hospitals influence in the local regions while member hospitals transfer patients to the core hospitals to help increase the amount of diagnosis and treatment of core hospitals. According to the author's on-the-spot investigation of the three medical treatment combinations, the degree of emphasis to the management of the treatment combination of the three core hospitals are as follows:

- Nanjing Drum Tower Hospital and Zhongda Hospital have special departments responsible for the medical treatment combination work, with centralized management.
- The medical treatment combination work in Jiangsu Province Hospital is divided into several departments, and effectively distinguishes the "medical treatment combination work" from the "counterpart support".

The above-mentioned three medical treatment combinations differ in terms of time of establishment, number of members, specific operation mode, degree of emphasis, and achievements obtained, while in terms of internal organization, they are all divided into compact and loose types. The compact type is conducive to promoting patient diversion, which means that patients can take initial diagnosis at primary medical institutions, and take appropriate checks if conditions permit. Patients should visit primary medical institutions of medical partnerships at the stable stage and convalescence stage, so patients do not need to go to big hospitals to take initial diagnosis or hospitalization. However, the integration among the major government-led hospitals is compact. At present, the county-level Grade II hospitals and the grassroots medical institutions have all joined the medical treatment combinations in a loose type mode. There is no data available on the grassroots diversion of the three major medical treatment combinations.

## 5.2 Confirmation of the stakeholders of tiered diagnosis and treatment to construct the association graph

### 5.2.1 Basic information of experts

20 copies of the expert consultation form were distributed, and all were responded. There are 20 experts, including 8 women and 12 men. The age of the all experts is above 35 years old, and 95% of them are between 40 and 55 years old. All of them are experts engaged in hospital management or health administration. These experts all have bachelor's degree or above and have been engaged in the related fields for about 10 years.

### 5.2.2 Degree of expert authority

The degree of authority of the expert  $C_r$  is calculated by the following formula:

$$C_r = (C_a + C_s) / 2 \quad (\text{Guo, 2003}) \quad (5.1)$$

Wherein,  $C_a$  is the assignment of experts' judgment, and  $C_s$  is the assignment of expert's familiarity with the project. The basis for selection to assign values to  $C_a$  and  $C_s$  are:

- the assignment of "practical experience" is 0.8,
- the assignment of "theoretical analysis" is 0.6,
- the assignment of "peer understanding" is 0.4,
- the assignment of "intuition" is 0.2;

In the aspect of familiarity:

- the assignment of "very familiar" is 1,
- the assignment of "more familiar" is 0.75,
- the assignment of "general" is 0.5,
- the assignment of "less familiar" is 0.25, the assignment of "very unfamiliar" is 0 (Chen, 2017).

The degree of authority of the experts in this study is 0.77, as shown in Table 5-1.

Table 5-1 Degree of expert authority (n = 20)

Project	Frequency	Assignment
C <sub>a</sub>	practical experience	0.74
	theoretical analysis	
	peer understanding	
	intuition	
	very familiar	
C <sub>s</sub>	more familiar	0.8
	general	
	less familiar	
	very unfamiliar	
Cr		0.77

Table 5-2 Consultation result of the 2nd round of expert consultation (n=20)

Options	Supporters	Support Rate/%
Health Administrative Department	20	100
Medical Insurance Department	20	100
Department of Finance	16	80
Price Department	14	70
National Development and Reform Commission	12	60
The government		
Food and Drug Administration	13	65
Administration for Industry and Commerce	11	55
Public security organs, the Procuratorates and people's courts	11	55
Public medical institutions		
Medical staff working at superior medical institutions	20	100
Medical staff working at primary medical institutions	20	100
Private medical institutions	17	85
The public (patients, relatives of patients and residents)	20	100

Media	Companies (suppliers of drugs, medical equipment and consumables)	18	90
	Centre for disease control and prevention	11	55
	Blood supply institutions	8	40
	Commercial insurance institution	13	65
	Industrial association	15	75
	Traditional media such as newspapers and news, etc.	16	80
	New media such as We-media and online media, etc.	16	80
	Medical students	9	45
	Medical education institutions	9	45
	Medical research institutions	9	45
	Retail pharmacy	7	35
	Banks	3	15

### 5.2.3 Confirmation of the stakeholders of tiered diagnosis and treatment

According to the first round of experts' suggestions:

- the managers of the tertiary hospitals, the managers of Grade III Level hospitals and the specialized hospitals, the medical personnel of the tertiary hospitals, the medical personnel of Grade III Level hospitals and specialized hospitals should be merged into the staff of medical institutions at higher levels;
- the managers of primary medical institutions and the medical personnel of primary medical institutions should be merged into the working staff of primary medical institutions;
- the managers and medical personnel of private medical institutions should be merged into private medical personnel;
- the patient, the family of the patient and the residents shall be combined into the public (the patient, the family members of the patient and the residents);
- and the drug suppliers, medical devices and consumables suppliers shall be combined into enterprises (pharmaceuticals, medical devices, consumables suppliers).

The revised expert consultation was resent to the 20 experts in the first round of

consultation.

More than 50% of the expert's approval ratings are identified as tiered diagnosis and treatment stakeholders, including the health administrative department, the medical insurance department, the financial department, the price control department, the National Development and Reform Commission, the Food and Drug Administration, the Industry and Commerce Administration, the Public Security Bureau, the Procuratorates, and the court, the staff of medical institutions at higher levels, staff of primary medical institutions, staff of private medical institutions, public (patients, patients' families, residents), enterprises (suppliers of medicines, medical devices, consumables), CDC, commercial insurance institutions, industrial associations, newspapers, news and other traditional media, public numbers, Microblog and other new media, the results are shown in Table 5-2.

#### **5.2.4 Classification of stakeholders**

According to the Mitchell score-based table, the authority, legitimacy and urgency of the health administration scored the highest, which are 100.00, 92.50 and 92.50 respectively. The first one third of the comprehensive score are:

- the health administration department,
- the medical care department,
- the superior medical institution staff,
- the public (patient, patient's family and resident),
- the primary medical institution staff,
- and the enterprise, that is, the core stakeholders.

The final one third of the total scores refer to new media, such as CDC, public number, Microblog, industrial and commercial administration department, personnel of private medical institutions, commercial insurance organizations, newspapers, news and other traditional media, that is, marginal stakeholders. The middle one third includes the financial department, the price control department, the National Development and Reform Commission, the Food and Drug Administration, the Public Security Bureau, the Procuratorates, the court and the trade association, that is, the general stakeholders. The results are shown in Appendix 9 Table1 to Table4. The connection of the five types of stakeholders is shown in the Figure 5-1.

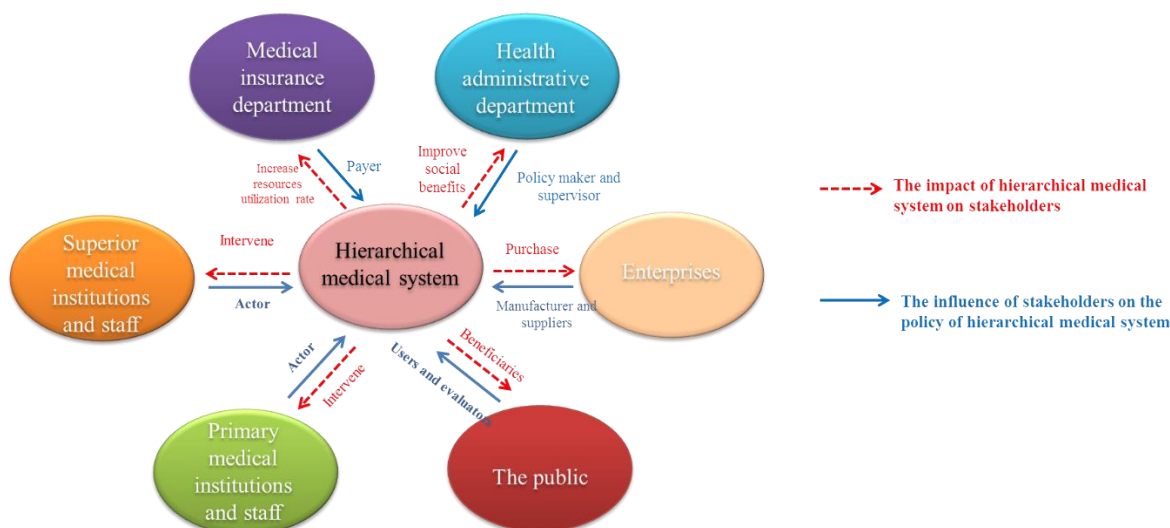


Figure 5-1 Stakeholders of tiered diagnosis and treatment system

## (1) Government

At the macro level, the government shall formulate and regulate medical policy to promote the health of residents, solve the problem of “difficulty and expensive in seeing a doctor” and protecting people's health rights (Zhang et al., 2010). The government also used to influence various interested groups in the field of medical policies through coordination of purchase, supply and supervision.

### a) Health administration department

At present, the central and local health administration departments are mostly related to the tiered diagnosis and treatment policy. They are the national medical policy makers and implementers of tiered diagnosis and treatment and other medical policies. In terms of drugs, it processes the power of approval, quality supervision, the decision-making power of essential drugs catalogue, the right of drug bidding and purchasing, etc. It is mainly responsible for the selection of essential drugs, the supervision of the production and circulation of drugs, the promotion of rational use of drugs, and the promotion of new drug research and development; in terms of health talent, it is responsible for the registration of health professionals, standardization of the behavior of medical personnel and formulation of the national health talents development plan, etc. However, the health administrative departments have a game relationship in terms of functions and rights distribution. Many of its policies need to coordinate the interests of all parties, and the implementation of the policy also needs the cooperation of other departments so as to truly implement.

## **b) Medical insurance department**

Traditionally, the medical insurance department masters the national medical insurance funds. It has the right to use the medical insurance expenses and is mainly responsible for the financing of health services and the financial subsidy required by the drug policy. Also, it is a powerful promoter of the implementation of the national tiered diagnosis and treatment policy. Through the primary diagnosis, two-way referral, rational use of drugs, reasonable inspection and other aspects of medical and health institutions, medical insurance implements preferential policies to medical and health institutions and controls the proportion of patients' reimbursement to guide the implementation of tiered diagnosis and treatment. The institutional reform plan of the State Council approved by the first session of the 13<sup>th</sup> National People's Congress integrates the basic medical insurance and maternity insurance responsibilities of urban workers and urban residents of the Ministry of Human Resources and Social Security (the 13<sup>th</sup> National People's Congress of the PRC, 2018), the new rural cooperative medical care responsibilities of the State Health and Family Planning Commission, the price management responsibilities of the Development and Reform Commission for medicines and medical services, and the medical assistance responsibilities of the Ministry of Civil Affairs, and set up the National Medical Security Bureau as an institution directly under the State Council. The main responsibilities of the State Medical Security Bureau are to formulate policies, plans and standards for medical security systems such as medical insurance, maternity insurance and medical assistance; supervise and manage relevant medical insurance funds; improve the national platform for the management and settlement of medical expenses in other places; organize and adjust the prices and charges of drugs and medical service; formulate and supervise the bidding and purchasing policy of drugs and medical consumables; and supervise and manage the medical service behavior and medical expenses included in the scope of medical insurance expenditure. The medical insurance department has become a medical insurance payment method department that integrates pricing, purchasing and payment. It is a key government department to carry out the implementation of the tiered diagnosis and treatment, which has ended the situation of decentralization of rights in the past.

## **(2) Health institutions and their staff**

China's medical service system mainly consists of hospitals, primary medical institutions and professional public health institutions. Wherein, hospitals are divided into general hospitals, traditional Chinese medicine hospital and specialized hospitals; primary medical institutions are divided into community health service centers (Stations), township health centers, village



clinics and outpatient departments (Clinics); and specialized public health institutions are divided into centers for disease prevention and control, specialist disease prevention and treatment hospital (institute/station), maternal and child health hospital (Institute/Station) and health supervision institute (Station) (China National Health and Family Planning Commission, 2018). At present, public medical institutions occupy an absolute dominant position in China's medical service institutions, while private medical institutions account for very little market share.

Medical and health institutions are the providers of medical services, one of the key stakeholders in the implementation of the tiered diagnosis and treatment policy, and the main objects of intervention of the national medical policy. On the one hand, the medical and health institutions hope to reduce operating costs. Improve the service quality, reduce the medical accidents, increase social trust, and attract more patients to go to hospital; on the other hand, it hopes to benefit from the use of drugs, inspection programs, or medical devices. The formulation and implementation of the national drug policy will affect the income of medical and health institutions by reducing the cost of drugs, the availability of inspection items, and the cost of medical devices, so as to alleviate the problem of "expensive medical treatment". Related policies can reduce unreasonable use of drugs, excessive examination and other problems, reduce the waste of medical resources, improve the social image of medical institutions, and gain more patient trust. However, with the implementation of the policy of "zero difference rate of drugs" and the increasing demand of national financial subsidy, the hospitals also need to absorb the corresponding expense gap by themselves.

The staff of medical institutions, including managers, doctors, nurses, medical technicians and so on, are the direct providers of medical services and the ultimate practitioners of the national tiered diagnosis and treatment policy. Their behavior will ultimately determine whether the tiered diagnosis and treatment policy can be carried forward. The staff of medical institutions want to maximize their own economic benefits while providing medical services, on the other hand, they want to accumulate reputation for themselves. The formulation and implementation of China's tiered diagnosis and treatment policy is used to standardize and constrain the medical behavior of the staff of medical institutions, thus affecting their economic interests and enthusiasm for work. The staff of medical institutions also serve as a bridge between China's tiered diagnosis and treatment policy and patient information transmission. In the daily diagnosis and treatment, the medical staff share the specific tiered diagnosis and treatment policy to the patients, and the practical effect of the medical staff on the tiered

diagnosis and treatment policy directly affects the patient's judgment of the policy. Therefore, the staff of medical institutions not only restrict and standardize the tiered diagnosis and treatment policy, but also affect the implementation effect of the tiered diagnosis and treatment policy.

### **(3) The public**

The public regards their own health and economic interests as the target. It is the demander, consumer and evaluator of medical services, and is the core stakeholder group engaged in the tiered diagnosis and treatment policy. At present, the main contradiction of medical services in China is the contradiction between supply and demand, that is, the growing demand for medical resources by patients and the shortage of medical services. "Difficulty and expensive in seeing a doctor" is the highest voice of patients at present. On the one hand, the government will reduce the drug burden of patients through the formulation and implementation of policies; on the other hand, through the supervision and management of drug quality to guarantee drug safety of the patients, the allocation of medical resources and the improvement of medical service capabilities, especially the improvement of grassroots medical service institutions, make patients become the ultimate beneficiaries of the tiered diagnosis and treatment policy, the patients should be the group with the strongest willingness to implement the tiered diagnosis and treatment policy, but it is not the case. The public is a vulnerable group and is in a passive position. Lack of information and lack of organization, therefore, ability of the Public to influence the implementation of policies is weak. The government should promote the implementation of the tiered diagnosis and treatment policy and form a favourable policy environment in addition to further strengthening the policy publicity to the Public, the government should also strengthen enthusiasm and participation of the public in the formulation of the policy.

### **(4) Enterprises**

The enterprises that produce and circulate medicines, medical devices and medical consumables are providers of basic materials for medical services and are completely marketization organizations, the ultimate goal of all their conducts is to maximize economic benefits. In China, the enterprises that produce and circulate medicines, medical devices and medical consumables have much less influence on the implementation of medicine policies than those in the US and Korea. Basically, they cannot influence the implementation of medicine policies, but they are greatly influenced by the policies. In China, the medicine production and circulation industry is one of the industries with high profit rate. The growth of profits in the

medicine industry has promoted the economic development and increased the tax revenue of the country. However, in China enterprises that produce and circulate medicines, medical devices and medical consumables need a considerable amount of money for “public relations” during their operation process. In the end, these “public relations fees” will be passed on to patients as costs. The cost of medicines will remain high for a long time and will eventually lead to an unreasonable increase in patients' medical expenses (Liu, 2012). Moreover, as a special industry related to people's life safety, the medicine industry should not only contain all the contents of the general enterprises social responsibility, but also shall assume the special responsibility for the life safety and health of the Public.

### **5.3 Research on core stakeholder’ s recognition, appeals and suggestions for tiered diagnosis and treatment**

This section will present the Basic Information, Recognition, and Appeals and Suggestions for Government Staff (Health Administration Department and Medical Insurance Department), staff at Superior Medical institutions, staff at Community-level Medical Institutions, the Public and Enterprise personnel.

#### **5.3.1 Government staff**

##### **5.3.1.1 Basic information**

200 questionnaires were distributed to government staff, and 171 valid questionnaires were recovered, with an effective recovery rate of 85.50%. Among the respondents, 53.22% are men and 46.78% are women. Respondents with a college degree or below account for 20.47%, while respondents with a bachelor’s degree or above account for 79.53%, with doctoral candidate as the highest academic qualification. 63.74% of the respondents are ordinary employees of government departments. The others are cadres at Division-Head level and above, Section-Head level and director-level, accounting for 7.02%, 12.28% and 16.96% respectively.

Respondents with a working experience of less than 5 years’ account for 33.92%, while those who have worked for 5-10 years, 10-20 years and over 20 years’ account for 25.73%, 47.37% and 6.43% respectively. Among the respondents, 13.45% of them have junior professional titles, 11.11% of them have medium-grade professional titles, and 4.68% with senior professional titles. See Table 5-3 for specific results.

Table 5-3 Basic information of government staff

Item	Category	Frequency	Percentage
Gender	Male	91	53.22%
	Female	80	46.78%
Age	<25	23	13.45%
	25-39	64	37.43%
	40-55	68	39.77%
	>55	16	9.36%
Education background	Ph.D. degree	31	18.13%
	Master's degree	45	26.32%
	Bachelor's degree	60	35.09%
	College degree or others	35	20.47%
	None	109	63.74%
Position	Yes	62	36.26%
	Division-Head level and above	12	7.02%
	Section-Head level	21	12.28%
	Director	29	16.96%
Working Experience	Less than 5 years	58	33.92%
	5-10 years	44	25.73%
	11-15 years	37	21.64%
	16-20 years	21	12.28%
	More than 20 years	11	6.43%
Professional title	None	121	70.76%
	Junior professional title	23	13.45%
	Medium-grade professional title	19	11.11%
	Senior professional title	8	4.68%

### 5.3.1.2 Recognition

According to research results, more than half of the government staff indicate that they are extremely familiar with or very familiar with the tiered diagnosis and treatment system. And 25.73% of them are not very familiar with or completely unfamiliar with the tiered diagnosis and treatment system. 72.51% of the government staff learn about the tiered diagnosis and treatment system through trainings provided by superior authorities or company trainings, while 19.30% of them learned about the tiered diagnosis and treatment system through mobile We-media. The rest of them learn about the system through traditional media or through family, friends and colleagues. Most of the respondents' institutions have launched the implementation

measures of the tiered diagnosis and treatment and conducted trainings for the tiered diagnosis and treatment.

More than 80% respondents can choose the right definition of tiered diagnosis and treatment, which is: disease treatment graded by its seriousness, urgency and treatment difficulty will be undertaken specifically by medical institutions at different levels to realize primary treatment at the community level and two-way transfer treatment. More than 90% government staff think that it is necessary to implement the tiered diagnosis and treatment, believing it will promote the formation of a sound health care structure, alleviate the medical burden of patients, reduce work load of big hospitals, relieve financial pressure, maintain social stability, promote rational allocation of medical resources, improve gross national happiness index and promote the progress of medical level. Among the government staff who believe that there is no need for the tiered diagnosis and treatment, 92.86% of them think that community-level medical institutions still need to improve their treatment, which is unfavorable for continuous therapy. And they also think that the system will limit the treatment autonomy of patients to a great extent. More than 80% of the staff believe that the public has long accepted the non-tiered diagnosis and treatment system. Over 70% of the staff are dissatisfied with the general implementation of the current tiered diagnosis and treatment, and more than 90% of the staff believe that the technical level and talent construction of community-level medical institutions need to be strengthened. Nearly 80% of the government staff believe that private capital has a low or very low participation in tiered diagnosis and treatment, and only 36.84% of the staff believe that private capital has a promising future for entering the community medical market. See Appendix 10, Table 1 for specific results.

### **5.3.1.3 Appeals and suggestions**

The government staff pay most attention to improvement in allocation of medical resources, with a highest average value of 4.39, and pay least attention to active participation in community health education and disease prevention and publicity, with a lowest average value of 2.69.

Other appeals with the higher average value include fair competition and reciprocal cooperation between hospitals, improvement of medical treatment at community hospitals to alleviate the work load of big hospitals, improvement in resource utilization of community-level medical institutions and necessary working facilities provided by the community-level medical institutions.

See Appendix 10, Table 2 for specific results. The government staff's suggestions mainly

include increasing investment in health and medical construction at the community level, optimizing medical insurance policies, formulating preferential policies to attract private capital to participate in tiered diagnosis and treatment and strengthening supervision of tiered diagnosis and treatment by regulators.

### **5.3.2 Staff at superior medical institutions**

#### **5.3.2.1 Basic information**

200 questionnaires were distributed to staff at superior medical institutions, and 185 valid questionnaires were recovered, with an effective recovery rate of 92.50%. Among the respondents, 51.89% of them are men and 48.11% are women. Respondents under the age of 25 account for 30.27%, while 63.78% of the respondents are between 25 and 55 years old and 5.95% of them are over 55 years old. 95.68% of the respondents have bachelor's degree or above with doctoral candidates accounting for 15.68%. And 4.32% of the respondents have college degree or below. Among the respondents, there are 4.32% general practitioners, 52.43% specialists, 12.43% nurses, 6.49% technicians, 4.86% pharmacists and 19.46% administrators. Respondents with a working experience of less than 5 years' account for 21.08%, while those who have worked for 5-10 years, 10-20 years and over 20 years' account for 31.35%, 41.62% and 5.95% respectively. Among the respondents, 28.11% of them have junior professional titles, 40.54% have medium-grade professional titles, and 24.86% have senior professional titles. See Table 5-4 for specific results.

#### **5.3.2.2 Recognition**

According to research results, 40.00% staff at superior medical institutions are extremely familiar with or very familiar with the tiered diagnosis and treatment system, while 29.73% of them are slightly familiar with or not familiar at all with the tiered diagnosis and treatment system.

14.59% staff at superior medical institutions learn about the tiered diagnosis and treatment system through the training of health administrative departments or their units' trainings, 52.43% of them learn about the tiered diagnosis and treatment system through mobile We-media, 29.73% of them learn about it through family, friends and colleagues and the rest of them learn about the system through web search or community outreaches.

Table 5-4 Basic information of staff at superior medical institutions

Item	Category	Frequency	Percentage
Gender	Male	96	51.89%
	Female	89	48.11%
Age	<25	56	30.27%
	25-39	78	42.16%
	40-55	40	21.62%
	>55	11	5.95%
Education	Ph. D. degree	29	15.68%
	Master's degree	85	45.95%
Background	Bachelor's degree	63	34.05%
	College degree or others	8	4.32%
	General practitioner	8	4.32%
Job	Specialist	97	52.43%
	Nurse	23	12.43%
Category	Technician	12	6.49%
	Pharmacist	9	4.86%
	Administrator	36	19.46%
	Less than 5 years	39	21.08%
Working	5-10 years	58	31.35%
	11-15 years	54	29.19%
	16-20 years	23	12.43%
	More than 20 years	11	5.95%
Experience	None	12	6.49%
	Junior professional title	52	28.11%
Professional Title	Medium-grade professional title	75	40.54%
	Senior professional title	46	24.86%

Among the respondents, 10.81% of their institutions have launched the implementation measures of the tiered diagnosis and treatment and the rest indicate that their institutions have not launched the implementation measures of the tiered diagnosis and treatment or they are unclear about the relevant information in their institutions. More than 70% respondents show that their medical institutions have not offered trainings related to the tiered diagnosis and treatment yet. Over 80% respondents can choose the right definition of tiered diagnosis and

treatment. In addition, 12.43% staff at superior medical institutions indicate that their institutions have passed some transfer indicators. 84.86% of the respondents show that their departments have received patients transferred from community-level medical institutions, and over 50% of the respondents have received more than 20 patients transferred from community-level medical institutions. 45.41% staff believe that half of patients admitted to the outpatient clinic can be cured at community-level medical institutions. Patients suffering from serious diseases are transferred most from community-level medical institutions, followed by patients suffering from complex diseases, patients with the requirement of themselves and their dependents, patients in need of special examinations unavailable at community-level medical institutions and patients suffering from common and frequently-occurring disease. In terms of the willingness of transferring to community-level institutions, 56.76% staff are willing to transfer inpatients in need of rehabilitation to community-level medical institutions in order to increase patient bed turnover efficiency and to ameliorate medical burdens on patients, while 43.24% staff are unwilling to transfer inpatients in need of rehabilitation to community-level medical institutions because they think the medical treatment needs to be improved at community-level medical institutions, which may affect continuous high-quality treatment for the patients. Moreover, patients may not want to be transferred due to their own needs. 38.92% of the respondents have handled transferring procedures for patients in the past two months, and over 80% of them think that the procedures are not too troublesome. 34.72% of the respondents are dissatisfied with the transfer process, and the main reason is the incapability of the community-level medical institutions in receiving, continuously treating and tracking the referred patients. 32.43% staff believe that it is not necessary to carry out tiered diagnosis and treatment, and there are two main reasons. One is that the community-level medical institutions need to improve their professional skills, which are not favorable to the patients' continuous medical treatment. And the other is that the public has formed a long-term concept of receiving medical treatment and has been difficult in accepting tiered diagnosis and treatment. 72.43% respondents are dissatisfied with or extremely dissatisfied with the implementation of current tiered diagnosis and treatment, who think the two main reasons impeding the progress of tiered diagnosis and treatment are the lack of talents for primary medical treatment as well as the incapability of primary medical care institutions. In order to promote the tiered diagnosis and treatment, over 50% respondents think it is required to enhance professional skills of community-level medical institutions, emphasize talent development for primary medical treatment and define standards and policies for patient transfer. See Appendix 10, Table 3 for the specific results.



### **5.3.2.3 Appeals and suggestions**

The staff at superior medical institutions pay most attention to the community-level medical institutions can provide me with sound benefits on safety, compensation for medical dispute and travel insurance, with the highest average value of 4.35, and pay least attention to gaining social recognition and improve social influence through work guidance at community-level medical institutions, with the lowest average value of 2.75. Other appeals with higher average value include increasing my income, enabling faster promotion by providing instructions at community-level medical institutions and being recognized by the leaders and colleagues, share my workload by providing instructions at member hospitals of the medical treatment combination.

See Appendix 10, Table 4 for the specific results. The suggestions from staff at superior medical institutions mainly include raising the level of community-level medical services and increasing the training of medical and health personnel.

### **5.3.3 Staff at community-level medical institutions**

#### **5.3.3.1 Basic information**

200 questionnaires were distributed to staff at community-level medical institutions, and 191 valid questionnaires were recovered, with an effective recovery rate of 95.50%. Among the respondents, 43.98% of them are men and 56.02% are women. Respondents under the age of 25 account for 32.46%, respondents between 25 and 55 years old account for 62.30% and those over 55 years old account for 5.24%. Respondents with a bachelor's degree or above account for 43.98%, with doctoral candidates accounting for 2.62%. And 56.02% of the respondents have college degree or below. Among the respondents, there are 8.38% general practitioners, 45.55% specialists, 16.23% nurses, 6.81% technicians, 5.24% pharmacists and 17.80% administrators. Respondents with a working experience of less than 5 years' account for 27.23%. Those who have worked for 5-10 years, 10-20 years and over 20 years' account for 32.98%, 37.70% and 2.09% respectively. Among the respondents, 35.60% have junior professional titles, 37.70% have medium-grade professional titles, 12.04% have senior professional titles, and the rest 14.66% respondents do not have professional titles. See Table 5-5 for the specific results.

Table 5-5 Basic information of staff at community-level medical institutions

Item	Category	Frequency	Percentage
Gender	Male	84	43.98%
	Female	107	56.02%
Age	<25	62	32.46%
	25-39	83	43.46%
	40-55	36	18.85%
	>55	10	5.24%
	Ph. D. degree	5	2.62%
Education	Master's degree	23	12.04%
Background	Bachelor's degree	56	29.32%
	College degree or others	107	56.02%
	General practitioner	16	8.38%
	Specialist	87	45.55%
Job	Nurse	31	16.23%
Category	Technician	13	6.81%
	Pharmacist	10	5.24%
	Administrator	34	17.80%
	Less than 5 years	52	27.23%
Working	5-10 years	63	32.98%
Experience	11-15 years	49	25.65%
	16-20 years	23	12.04%
	More than 20 years	4	2.09%
	None	28	14.66%
Professional Title	Junior professional title	68	35.60%
	Medium-grade professional title	72	37.70%
	Senior professional title	23	12.04%

### 5.3.3.2 Recognition

According to research results, 33.51% staff at community-level medical institutions are extremely familiar with or very familiar with the tiered diagnosis and treatment system, while 34.03% of them are not very familiar with or completely unfamiliar with the tiered diagnosis and treatment system. 26.70% staff at community-level medical institutions learn about the tiered diagnosis and treatment system through the training of health administrative departments or their units' trainings, 38.74% learn about the tiered diagnosis and treatment system through mobile We-media, 29.84% learn about it through family, friends and colleagues and the rest of

them learn about the system through web search or community outreaches. 16.75% of the respondents' institutions have launched the implementation measures of the tiered diagnosis and treatment and the rest of respondents indicate that their institutions have not launched the implementation measures of the tiered diagnosis and treatment or they are unclear about the relevant information in their institutions. More than 50% respondents show that their medical institutions have not offered trainings related to the tiered diagnosis and treatment yet. Over 70% respondents can choose the right definition of tiered diagnosis and treatment. In addition, 25.13% staff at community-level medical institutions indicate that their institutions have passed some transfer indicators. And 30.37% staff believe that over half of outpatients can usually be treated at community-level medical institutions. Staff at community-level medical institutions think that the implementation of primary treatment at the community level has two main influences: promoting the society to be more concerned about the development of primary medical treatment and enhancing professional skills of staff working at community-level medical institutions. In respondents' opinion, the lack of medical staff and professional skills is the main reason for their medical institutions incapable of fulfilling the requirements of patient transfer. More than 50% staff at community-level medical institutions indicate that they have not receive patients transferred from superior medical institutions in the past two months. Patients suffering from common and frequently-occurring disease with definite diagnostic results and treatment plans are transferred most from superior medical institutions, followed by patients in need of palliative care and patients in the stage of rehabilitation or recovery. 82.72% respondents have handled patient transfers in the past two months. And the mostly common reasons for patients transferring to superior hospitals include: on the one hand, the patients' diseases are beyond the treatment scope of community-level medical institutions, on the other hand, the patients are unwilling to take any potential risks. Over 80% staff believe that the procedures are not too troublesome or very convenient. 76.44% of the staff at community-level medical institutions find it necessary to carry out tiered diagnosis and treatment mainly because it can stimulate the formation of reasonable medical treatment. Staff who find it is not necessary to carry out tiered diagnosis and treatment believe that the community-level medical institutions have to improve their professional skills, which are not favorable to the patients' continuous medical treatment and that the public has formed a long-term concept of receiving medical treatment and thus rejecting tiered diagnosis and treatment. 78.01% respondents are dissatisfied with or extremely dissatisfied with the implementation of current tiered diagnosis and treatment. Staff at community-level medical institutions believe that main points for promoting the tiered diagnosis and treatment lie in enhancement of professional skills at community-level medical

institutions, emphasis on talent development for community-level medical treatment, definite risk-sharing mechanism, intensification of publicity to guide the public in medical treatment and definite standards and policies for patient transfer. See Appendix 10, Table 5 for the specific results.

### **5.3.3.3 Appeals and suggestions**

The staff at community-level medical institutions pay most attention to getting instructions and assistance from experts of the hospital, with the highest average value of 4.43, and pay least attention to having nice environment for diagnosis, treatment and work with the lowest average value of 2.87. Other appeals with higher average value include getting opportunity of training and further education to improve my professional skills, gaining reasonable salary commensurate with my contribution to increase my income, receiving sound safety guarantee and having reasonable and proper mechanism for professional promotion.

See Appendix 10, Table 6 for the specific results. Suggestions from staff at community-level medical institutions mainly include improving the community-level medical services and increasing the training of medical and health personnel.

## **5.3.4 The public**

### **5.3.4.1 Basic information**

In this survey, 176 valid questionnaires were recovered among the total 200 questionnaires distributed to the public, so the effective recovery rate is 88.00%. Among all the respondents, 52.27% are men and 47.73% are women; 20.45% are under 25 years old, 59.66% between 25 and 55 years old, and 19.89% over 55 years old; 34.09% are undergraduates or above, and 65.91% junior college graduates or below. As for the job, 28.98% of the respondents work in administrative organs or governmental units, 17.61% in enterprises, 30.11% are retired and others are self-employed, farmers or students. 0.57% respondents have a monthly household income of lower than 2000 yuan, while 31.82% have over 10,000 yuan. In terms of medical insurance, 13.07% of the respondents are covered by the new rural cooperative medical insurance, 43.18% by the basic medical insurance for urban employees, 32.39% by the medical insurance for urban residents, 5.11% by the free medical treatment, 5.11% by commercial medical insurance, and the rest are self-funded. For more than 50% of the public, the nearest medical institutions are the health clinics in town or community health centers.

Table 5-6 Basic information of the public

Item	Category	Frequency	Percentage
Gender	Male	92	52.27%
	Female	84	47.73%
Age	Under 25	36	20.45%
	25-39	49	27.84%
	40-55	56	31.82%
	Above 55	35	19.89%
Education Background	Junior high school or below	23	13.07%
	High school	44	25.00%
	Technical secondary school or junior college	49	27.84%
	Bachelor's Degree	38	21.59%
	Above Bachelor's Degree	22	12.50%
	Job category	Administrative department	20
Public institution		31	17.61%
Enterprise		34	19.32%
Self-employed employer		9	5.11%
Farmer		23	13.07%
Student		6	3.41%
Retired personnel		53	30.11%
Soldier		0	0.00%
Others		0	0.00%
Monthly household income (RMB)		Below 2000	1
	2000—5000	12	6.82%
	5001—8000	46	26.14%
	8001—10,000	61	34.66%
	Over 10,000	56	31.82%
Medical insurance	New rural cooperative medical insurance	23	13.07%
	Medical insurance for urban employees	76	43.18%
	Medical insurance for urban citizens	57	32.39%
	Completely free medical treatment	9	5.11%
	Commercial medical insurance	9	5.11%
	Self-supporting	2	1.14%

Nearest Medical institution in the citizen's region	Health clinic in town or community health centre	102	57.95%
	County level or district level hospital	45	25.57%
	Provincial/municipal tertiary hospital	29	16.48%
The most important factor in the choice of hospital for illness treatment	State of an illness	32	18.18%
	Expenses	6	3.41%
	Distance	6	3.41%
	Service attitude	18	10.23%
	Medical care quality	96	54.55%
	Capacity for medical equipment	10	5.68%
	Proportion reimbursement made by medical insurance	8	4.55%
	Varieties of medicines	0	0.00%
	Sound sanitary environment	0	0.00%
	The first choice when you or your family get sick	health clinic in town or community health centre	42
comprehensive large hospital (including county/district level hospital, provincial/municipal tertiary hospital)		125	71.02%
Private clinic		0	0.00%
to purchase drugs at a retail pharmacy		9	5.11%

And they choose medical institutions according to the quality of medical care, while large general hospitals, such as the county level or district level hospitals and provincial/municipal tertiary hospitals, are the first choice for over 70% of the public when they or their family get sick. The survey results are shown in Table 5-6.

#### 5.3.4.2 Recognition

According to the results, 77.84% of the public are not very familiar or completely unfamiliar with the tiered diagnosis and treatment system and only 8.52% are extremely familiar or very familiar with the tiered diagnosis and treatment system. 38.07% have learned

about the tiered diagnosis and treatment system from the hospital personnel or health technicians, 25.00% through We-media such as Microblog and WeChat public accounts., 19.32% through community publicity and other respondents from traditional media like CCTV and newspapers, or from family members, friends or colleagues. 56.25% of them think that the tiered diagnosis and treatment refers to the patient transfer upwards following the order of community-level medical institutions, second-level and tertiary hospitals. 43.75% can pick the correct definition of tiered diagnosis and treatment. However, more than 80% do not know the policy of initial treatment by community-level medical institutions. 30.11% have not received medical treatment in the health clinic in town/ community health center in the past six months in the past 6 months and 88.07% have received medical treatment in comprehensive large general hospital in the past six months. Over 90% can reach the nearest health clinic in town or community health center within 30 minutes by walking. 58.52% are reluctant to choose community-level health care institutions for two main reasons: the incompetency of the doctors and patients' own preference in medical treatment choice, while 19.89% are willing to go to the community-level medical institutions mainly because they are diagnosed with common or frequently-occurring diseases or they only go to the institutions for medicine. 21.59% believe that the patient's state of illness determines whether to choose a community-level medical institution for the initial diagnosis. 40.34% have heard about the two-way transfer service between superior hospitals and health clinic in town/community health center mainly from community-level medical institutions or their medical personnel. 52.27% of the respondents have experienced transfer to other hospitals with doctor's oral recommendations as the first cause, followed by the requirement of themselves or their family. Patients with such referral experience think that the most unsatisfying during the course of transfer is that they are not allowed to choose the hospital to transfer to except those within the medical treatment combination. Some people are unaware of the transfer flow and standards and have to accept repeated examinations. The public believes that referral facilitates timely and continuous treatment of diseases and cuts treatment procedures and waiting time. More than 50% of the respondents agree that after transfer, the proportion of medical reimbursement increases. 40.91% believe that it is necessary to implement the policy of tiered diagnosis and treatment which largely reduces the stress on large hospitals, while 59.72% consider the policy unnecessary for that it seriously restrict choices by patients over medical treatment. 74.43% of the public are dissatisfied or even very dissatisfied with the tiered diagnosis and treatment. The detailed results are shown in Appendix 10, Table 7.

### **5.3.4.3 Interest appeals and propositions**

The public pays the most attention to guaranteeing the safety of medical services, with the highest average value of 4.42, while carrying out health education to the public on a regular basis gets the least attention with the lowest average value of 2.36. Interest appeal items with higher average value include seeking medical treatment in a more convenient and highly efficient manner, reducing the waiting time for outpatient services at superior hospitals, getting access to medical treatment in time at nearby medical institutions and recognize the diagnosis results mutually among hospitals within medical treatment combination for the purpose of reducing unnecessary repeated examinations.

The detailed results are shown in Appendix 10, Table 8. The suggestions mainly include increasing the number of experts from the superior hospitals to the community-level medical institutions, reducing unnecessary repeated examinations after patient transfer, and shortening the waiting time for treatment in large hospitals.

### **5.3.5 Enterprise personnel**

#### **5.3.5.1 Basic information**

In this survey, 189 valid questionnaires were recovered among 200 questionnaires distributed to enterprise staff, with an effective recovery rate of 94.50%. Among the respondents, 47.62% are male and 52.38% are female; 33.33% are under 25 years old, 60.85% are between 25 and 55 years old, and 5.82% are over 55 years old; 51.32% are undergraduate or above, and 48.68% are junior college graduates or below. Management staff account for 23.28% of the total respondents. As for their working years, 30.16% of them have worked for less than 5 years, 58.73% for 5 to 20 years, and 11.11% for over 20 years. In terms of professional title, 25.40% have junior titles, 6.35% have intermediate ones, 1.06% have senior ones and 67.20% have none. The detailed results are shown in Table 5-7.

#### **5.3.5.2 Recognition**

Results show that 75.66% of the enterprise staff are not familiar or completely unfamiliar with the system of tiered diagnosis and treatment. Among those who know about it, 40.21% get the information through We-media such as Microblog and WeChat public accounts, 28.04% from traditional media like CCTV and newspapers, 20.63% from recommendations by family, friends or colleagues, and others from community publicity or the medical personnel of medical institutions.



Table 5-7 Basic information about enterprise staff

Item	Category	Frequency	Percentage
Gender	Male	90	47.62%
	Female	99	52.38%
Age	Under 25	63	33.33%
	25-39	57	30.16%
	40-55	58	30.69%
	>55	11	5.82%
Education Background	Ph.D degree	9	4.76%
	Master's Degree	32	16.93%
	Bachelor's Degree	56	29.63%
	College degree or below	92	48.68%
Do you have a job?	No	145	76.72%
	Yes	44	23.28%
Working experience	Department manager or above	8	4.23%
	Department director	12	6.35%
	Team leader	24	12.70%
	Under 5	57	30.16%
	5-10	44	23.28%
Professional title	11-15	47	24.87%
	16-20	20	10.58%
	Over 20	21	11.11%
	None	127	67.20%
	Junior	48	25.40%
	Intermediate	12	6.35%
	Senior	2	1.06%

38.68% of the respondents said their enterprises never give training in this respect. 57.67% perceive the tiered diagnosis and treatment as transfer in the order from primary medical institution to second-level and tertiary hospitals. 42.33% can choose the correct definition of tiered diagnosis and treatment. 53.97% see the tiered diagnosis and treatment as an unnecessary policy for three reasons: the current incompetency of primary medical institutions is uncondusive to carry out continuous treatment for the patients, the second is that it will seriously restrict choices by patients, and the last is that the public has formed a long-term

concept of receiving medical care and won't easily welcome tiered diagnosis and treatment. 86.24% of the enterprise staff are dissatisfied or even very dissatisfied with how the policy works now. Over 50% think that the development of tiered diagnosis and treatment requires Professional skill enhancement of community-level medical institutions, definite business scope of medical institutions of different levels, and increasing promotion to instruct the public. 88.36% consider low the participation of enterprises in the tiered diagnosis and treatment. 23.81% believe the participation of medicine suppliers is the highest while 6.35% the highest participation belongs to suppliers of medical devices and medical materials. More than 50% of the enterprise staff point out the little or extremely little influence of the system on enterprises, and vice versa. The detailed results are shown in Appendix 10, Table 9.

### **5.3.5.3 Interest appeals and propositions**

Enterprise staff members pay the most attention to increasing personal income, with the highest average value of 4.31, while the least to enhancing the enterprise's brand reputation, with the lowest average value of 3.01. Interest appeal items with higher average value include actively participating in tiered diagnosis and treatment, and get promotion opportunities, increasing the medicine categories of community-level medical institutions and expanding the insurance coverage on medicine.

The detailed results are shown in Appendix 10, Table 10. Their suggestions mainly include increasing the participation of enterprises, granting preferential policies like tax advantages to enterprises involved in the implementation of tiered diagnosis and treatment, and expanding the involvement scope of this treatment.

## Chapter 6: Discussion

### 6.1 Case study of three medical partnerships in Nanjing

The *Guiding Opinions of the General Office of State Council of the People's Republic of China (PRC) on Promoting the Construction and Development of Medical Partnerships* points out that the construction of medical partnership is beneficial to adjusting and optimizing the structural configuration of medical resources, better implementing the system of tiered diagnosis and treatment and meeting the public health demands; and that all Grade III hospitals should participate in the construction of medical partnership by 2017 and all Grade II public hospitals and government-sponsored primary medical and health institutions should be integrated into medical partnership by 2020 (General Office of the State Council of the PRC, 2017a). Besides Jiangsu Province Hospital Group, Nanjing Drum Tower Hospital Group and Zhongda Hospital of Southeast University Group, many Grade III hospitals in Nanjing, such as Nanjing First Hospital, the Second Hospital of Nanjing and Nanjing Integrated Traditional Chinese and Western Medicine Hospital have also established their own medical partnerships. The author selected Jiangsu Province Hospital Group, Nanjing Drum Tower Hospital Group and Zhongda Hospital of Southeast University Group for this research, the for the following reasons:

(1) These three medical partnerships are relatively large in scale and their medical services are quite influential in Jiangsu Province as well as in surrounding provinces and cities.

(2) The competent organizations of these three medical partnerships are different, which are Jiangsu Commission of Health, Nanjing Commission of Health and Ministry of Education of the PRC respectively, which boasts representativeness.

Among these three medical partnerships, Nanjing Drum Tower Hospital Group was the earliest one to be established, followed by Jiangsu Province Hospital Group and Zhongda Hospital of Southeast University Group. They were all established based on the model of “government designation plus voluntary association”. “Government designation” indicates that some member hospitals of medical groups establish medical partnerships with core hospitals according to the policies released by Jiangsu provincial government departments or Nanjing municipal government departments. These government-designated member hospitals mainly

include the current branch hospitals of medical groups, such as W&C Branch Hospital of Jiangsu Province Hospital, Liuhe Branch Hospital of Nanjing Drum Tower Hospital, Lishui Branch Hospital of Zhongda Hospital of Southeast University. In addition, the community health service centers of medical groups are also included in the medical partnerships according to government designation. “Voluntary association” refers to the practice where member hospitals participate in medical partnerships by signing cooperative agreements with core hospitals to deliver win-win results. Government-designated medical partnerships can rapidly develop into tightly-knit partnerships achieving unified management of human resources and properties, which is good for their stability. However, most medical partnerships formed through voluntary association are loosely-knit partnerships where both parties take on more cooperative relationship. As the parties involved take what they need from each other, the stability of such medical partnerships is poorer than that of government-designated ones.

The Chinese government requires that medical groups should be promoted in cities (cities with subordinate districts and above levels), medical communities be promoted in counties, alliances of specialized departments be promoted across different regions and telemedicine be promoted in outlying poverty-stricken areas (General Office of State Council of the PRC, 2017a). The above measures help to improve and optimize the distribution of medical resources, and raise the primary medical service capability. But it should be noted that if large hospitals take medical groups (medical partnerships) as a focal point and attract more and more member hospitals and cover a broader range and form a regional medical monopoly, the medical partnerships will virtually become a tool for large hospitals to expand themselves, strengthen core hospitals’ syphonic effect, attract patients and outstanding doctors in grass-root regions and finally rush to stake their claim in new markets.

## **6.2 Research on core stakeholders**

Based on literature review and combining with expert consultation, this research concludes that the stakeholders of tiered diagnosis and treatment include health administrative department, medical insurance department, department of finance, price department, National Development and Reform Commission, Food and Drug Administration, administration for industry and commerce, public security organs, the procuratorates and people’s courts, medical staff working at superior medical institutions, medical staff working at primary medical institutions, medical staff working at private medical institutions, the public (patients, dependents of patients and

residents), companies (suppliers of drugs, medical equipment and consumables), center for disease control and prevention, commercial insurance institutions, industrial associations, traditional media such as newspapers and news, new media such as WeChat official accounts and Microblog.

Based on this, Mitchell score-based table was used to divide the stakeholders into core stakeholders, including the health administrative department, medical insurance department, medical staff working at superior medical institutions, the public (patients, dependents of patients and residents), medical staff working at primary medical institutions, and companies; general stakeholders, including the department of finance, the pricing department, National Development and Reform Commission, Food and Drug Administration, public security organs, procuratorial departments and people's courts, and industrial associations; and marginal stakeholders, including the center for disease control and prevention, new media means such as WeChat official accounts and Microblog, the administration for industry and commerce, medical staff working at private medical institutions, commercial insurance institutions, traditional media means such as newspapers and news.

Several questionnaires were designed for core stakeholders, including "Questionnaire for Government Staff", "Questionnaire for Staff at Superior Medical Institutions", "Questionnaire for Staff at Primary Medical Institutions", "Questionnaire for the Public", and "Questionnaire for Enterprise Personnel".

### **6.2.1 Core stakeholders' cognition of the system of tiered diagnosis and treatment**

According to the survey results, the level of core stakeholders' cognition of this system is shown as follows: governmental staff > medical staff working at superior medical institutions > medical staff working at primary medical institutions > enterprise's employees > the public. Over 50% of governmental staff are very familiar or familiar with this system and more than 80% of them can correctly choose the right definition of this system. Only 8.52% of the public are very familiar or familiar with this system and 43.75% of them can correctly choose the right definition. 8.99% of enterprises' employees (marginally higher than that of the public) are very familiar or familiar with this system and 42.33% of them can correctly choose the right definition. 40.00% of medical staff working at upper-level medical institutions, which is higher than that of primary medical institutions (33.51%) are very familiar or familiar with this system and 81.62% of them, also higher than that of primary medical institutions (78.01%), can correctly choose the right definition.

In terms of the ways to know about this system, the survey results show that 72.51% of governmental staff get to know this system through training organized by superior authorities or their work unit; 52.43% of medical staff working at upper-level medical institutions and 38.74% of medical staff working at primary medical institutions and 40.21% of enterprises' employees get to know this system from such mobile we-media as Microblog and WeChat official account; while 31.82% of the public get to know this system from primary medical institutions or health technical personnel.

Based on the above results, it is learned that different stakeholders' cognition of the system of tiered diagnosis and treatment is greatly different. Except governmental staff, other stakeholders, especially the public and enterprises' employees, demonstrate relatively low cognition of this system. Also, different publicity methods should be adopted for different stakeholders. As medical staff working at upper-level medical institutions and primary medical institutions and enterprise employees are easy to be concentrated for centralized training, upper-level competent departments can carry out special training of tiered diagnosis and treatment, and then, each work unit can conduct internal seminars in a bid to raise these stakeholders' cognition of tiered diagnosis and treatment. To increase the awareness of the public, on the one hand, employees of medical institutions, particularly those of upper-level medical institutions, should make greater efforts to advance the publicity and education for the public. On the other hand, centralized training and publicity can be conducted in communities. With the rise of mobile we-media, governmental departments should give play to the role of official public accounts to advertise the system of tiered diagnosis and treatment in a straightforward way, instead of simply releasing policies related to this system.

### **6.2.2 Core stakeholders' recognition of the system of tiered diagnosis and treatment**

The survey results show that governmental staff and employees of medical institutions demonstrate higher recognition of the necessity to implement this system than the public and enterprise employees. The level of such recognition is shown as follows: governmental staff (91.81%) > medical staff working at primary medical institutions (76.44%) > medical staff working at upper-level medical institutions (67.57%) > enterprise's employees (46.03%) > the public (40.91%).

Among the reasons for implementing this system, governmental staff, medical staff working at primary medical institutions and enterprise employees believe that the most important one is to promote the formation of a sound health care structure; medical staff

working at upper-level medical institutions consider that the most important is that it is conducive to maximizing the efficient and effective use of medical resources; and the public thinks that the most important reason is to reduce workloads of large-scale hospitals.

On one hand, Governmental staff, medical staff working at upper-level medical institutions and medical staff working at primary medical institutions believe that the reasons for not bothering to implement this system include: primary medical institutions still need to improve their treatment because their current treatment level fails to meet the requirements of continuous therapy (primary reason); the public has formed a long-term concept of receiving medical treatment and thus won't easily accept tiered diagnosis and treatment; this system has seriously limited the choices made by patients.

On the other hand, the public and enterprise employees think that the reasons behind include: this system has seriously limited the choices made by patients (primary reason); primary medical institutions still need to improve their treatment because their current treatment level fails to meet the requirements of continuous therapy; the public has formed a long-term concept of receiving medical treatment and thus won't easily accept tiered diagnosis and treatment.

Both supporters and opponents of the tiered diagnosis and treatment system mainly consider the allocation of medical resources, medical care habits of the public and rights of independent medical care. China's quality medical resources are mainly concentrated in large-scale hospitals, whose medical workers' treatment levels and medical equipment are much better than that of primary medical institutions. In recent years, the Chinese government has introduced relevant policies to strengthen the primary health construction. In terms of hardware, sufficient financial investment can shore up the shortage, improve the medical environment in primary medical institutions and increase the amount of advanced medical facilities. Regarding software, however, the shortage of medical talents, especially general practitioners, cannot be made up in a short time as the cultivation of medical talents takes a long time.

The General Office of State Council of the PRC (2018a) introduced the *Opinions on Reforming and Improving the Training and Incentive Mechanism for General Practitioners* in 2018. On the one hand, such incentive measures as raising salary and providing preferential professional title promotion are adopted to attract more general practitioners and encourage specialist doctors in hospitals of Grade II and above to participate in the job-transfer training for general practitioners. Those trained and qualified doctors can expand the scope of general practice. On the other hand, the education and training of general practitioners should be

enhanced to broaden the scale of general practitioner training and constantly improve the quality of training.

Although the professional title promotion of staff of upper-level medical institutions in many places is directly linked to their length of service in primary medical institutions, there is still a shortage of 500,000 general practitioners in China (Baijiahao, 2018). According to a survey on 2,302 Chinese medical students conducted by Zhang et al. (2016), the majority of medical graduates are unwilling to work in primary medical institutions and only 19.1% of them clearly show such willingness. 5.7% of them oppose to work in grassroots communities and 41.5% of them take working in communities as their transitional period. 33.7% of them regard working in community medical institutions as alternative and medical students from rural areas are more willing to work in community-level medical institutions than those from urban areas. Based on the above research results, as for cultivating general practitioners, on the one hand, such policies as directional entrusted training as well as deductions and exemptions of tuition can be adopted for medical students from rural areas. On the other hand, the social recognition of general practitioners should be raised and more opportunities of internship in primary medical institutions should be provided to medical students and the internship duration should be extended. China offers a five-year program for undergraduate medical education. In the last academic year, students are arranged to go on an internship to the hospitals affiliated to their universities or colleges, most of which are large-scale comprehensive hospitals. And thus the students have few opportunities to come into contact with primary medical institutions. Consequently, it is extremely necessary to strengthen the publicity and education for medical students about general practice and working in primary medical institutions.

Based on the survey results, it is understood that Chinese people usually choose large-scale comprehensive hospitals as their first choice for medical services. Although over 90% of them can reach primary medical institutions within 30 minutes' walk, few of them (19.89%) would go to primary medical institutions for initial medical services. Most patients (88.57%) go to primary medical institutions for the initial diagnosis of frequently-occurring diseases and common diseases and 80.00% of them go to primary medical institutions only for prescription. It is clear that the primary medical institutions are being reduced to pharmacies, greatly wasting the medical resources. The public are unwilling to go to primary medical institutions for initial diagnosis because they believe that the medical technological level of these institutions is low and they are not used to going to these institutions for initial diagnosis because they lack testing equipment. Among the patients transferred from primary medical institutions to upper-level



ones, 55.68% of them are transferred by doctors in primary medical institutions at the request of patients or their families, and 33.51% of them suffer from common diseases and frequently-occurring diseases. For a long time, Chinese people can independently choose medical institutions for initial diagnosis and the system of tiered diagnosis and treatment does not require the public to seek for initial diagnosis in primary medical institutions. It is the habits of the public in medical care that hinder the implementation of this system.

It has been over ten years since the concept of tiered diagnosis and treatment was proposed, but the survey results show that the core stakeholders take on relatively low (less than 30%) satisfaction of the implementation of this system. The core stakeholders generally believe that the primary task in promoting this system is to intensify the cultivation of medical talents at grassroots levels and raise the treatment levels of primary medical institutions. In addition, efforts should also be made to strengthen the education and publicity and change the habits of the public in medical care formed in the long run.

### **6.2.3 Core stakeholders' interest demands of the system of tiered diagnosis and treatment**

According to the survey results of this research, among the governmental departments, the core stakeholders of tiered diagnosis and treatment are health administrative departments and medical insurance departments, namely the reformed health commissions and medical security bureaus at all levels. Responsible for the management and supervision of national health undertakings as well as pricing, purchasing and payment of medical services, these commission and bureaus show high authority, legality and urgency of the system of tiered diagnosis and treatment.

Based on their attention (from high to low), governmental departments' interest demands of tiered diagnosis and treatment can be divided into four categories:

(1) Reasonable allocation of medical resources, orderly medical treatment, and efficient utilization of medical resources; the specific demands are shown in Appendix10 Table 2 (Q29, Q12, Q27, Q28, Q9, Q21, Q22, and Q32).

(2) Medical treatment experience and satisfaction of the public; the specific demands are shown in Appendix10 Table 2 (Q26, Q25, Q5, Q7, Q8, Q33 and Q10).

(3) Legality and rationality of medical institutions' operation and management, as well as the sustainability of medical insurance funds; the specific demands are shown in Appendix10 Table 2 (Q1, Q2, Q3, Q4, Q15, Q23, Q18, Q6, Q31, Q14, Q13, Q16, Q17, Q24, Q34, Q35, Q30, and Q11).

(4) Public health service functions; the specific demands are shown in Appendix10 Table 2 (Q19 and Q20).

In recent years, the problem of “expensive medical bills and difficult access to quality medical services” has always remained a hot spot in the society. And frequent events of doctors being hurt by patients or patients’ families and problematic vaccine as well as low public satisfaction of medical services severely affect social harmony and stability. Governmental investments into medical and health care have increased year by year and various medical institutions cover all people, from rural and urban areas, but the allocation of medical resources are still uneven and quality medical health talents and facilities are mainly concentrated in hospital, particularly the Grade III hospitals, so primary medical institutions can only provide relatively low-level medical service. Therefore, the key to promote tiered diagnosis and treatment lies in reasonably allocating medical resources, increasing the efficient utilization of medical resources and medical insurance funds, as well as curbing the falsely high medical expenses.

In terms of employees of superior medical institutions, based on attention (from high to low), the interest demands can be divided into four categories:

(1) Individual development and respect reception; the specific demands are shown in Appendix10 Table 4 (Q10, Q1, Q3, Q7, Q4, Q21, Q12, and Q11).

(2) Promoting the development of primary medical institutions, relieving the pressure of upper-level medical institutions and bringing more convenience to the patients in medical treatment; the specific demands are shown in Appendix10 Table 4 (Q25, Q20, Q14, Q24, Q5, Q26, Q19, Q23, Q22, and Q18).

(3) Advancing the development of upper-level medical institutions; the specific demands are shown in Appendix10 Table 4 (Q13, Q16, Q17, and Q15).

(4) Working environment and rise of personal social influence; the specific demands are shown in Appendix10 Table 4 (Q8, Q2, Q9, and Q6).

While in terms of employees of primary medical institutions, based on attention (from high to low), the interest demands of can be divided into four categories:

(1) Individual development and welfare; the specific demands are shown in Appendix10 Table 6 (Q9, Q10, Q1, Q4, Q11, Q2, and Q16).

(2) Bringing more convenience to patients and receiving respect; the specific demands are shown in Appendix10 Table 6 (Q20, Q17, Q15, Q8, Q13, and Q21).

(3) Developing the business and management in primary medical institutions; the specific demands are shown in Appendix10 Table 6 (Q18, Q14, Q12, and Q19).

(4) Working environment, workload and emotional support; the specific demands are shown in Appendix10 Table 6 (Q7, Q6, Q5, and Q3).

According to the above analysis, it is clear that employees in medical institutions have relatively high demands for individual development, and post promotion, professional title promotion as well as salary rise are the recognition of their work as well as an important reflection of their individual value. Generally, employees in upper-level medical institutions face relatively high pressure for promotion. On the one hand, they need to undertake a good deal of clinical work, and on the other hand, they need to be engaged in scientific research, apply for national and provincial projects and publish academic papers. The pressure of competition in Grade III Level A hospitals is extremely high. Although the General Office of CPC Central Committee and the General Office of State Council of the PRC have jointly released the *Opinions on Deepening the Reform of Professional Rankings System* to reform the professional ranking evaluation system, in practice, scientific research still fails to be completely disconnected with the professional ranking evaluation in the short term. Employees in primary medical institutions also suffer from pressure of professional title promotion. In accordance with the requirements stipulated in *Notice on Four Qualifications for Community Associate Chief Physicians (Pharmacists, Nurses and Technicians) in Jiangsu Province*, applicants to be promoted as vice-senior professionals should have relatively strong awareness and capacity in scientific research, be able to undertake scientific research projects or serve as partners or collaborators of the scientific research projects, and be able to conduct research on the basic theories and operational issues of their professions (Office of Professional Title Leading Group of Jiangsu Provincial Commission of Health and Family Planning, 2017a). There are higher qualifications for applicants of community chief physicians (pharmacists, nurses and technicians): applicants are required to be able to keep abreast with advancements of their professions, independently undertake scientific research, propose projects based on the development of their professions, design, organize and summarize projects (Office of Professional Title Leading Group of Jiangsu Provincial Commission of Health and Family Planning, 2017b). It is known to all that primary medical institutions do not have the capability and conditions for scientific research at all, and the number of patients in primary medical institutions is limited. Thus their overall business volume and business income are relatively low, with limited governmental compensations. In addition, they do not spare any funds for

medical workers' scientific research and the medical workers are unable to apply for relevant projects. As a result, it is very difficult for primary medical workers to be promoted from intermediate professional titles to the senior ones. As professional titles are directly linked with salaries and welfare, employees of primary medical institutions are provided with lower salaries than their counterparts in upper-level medical institutions. If things remain unchanged, the working enthusiasm of employees of primary medical institutions will be lowered and it will be difficult to raise medical levels, thus forming a vicious circle. Therefore, China should introduce and implement relevant professional title systems and salary systems to proactively arouse the working enthusiasm of employees of both upper-level and lower-level medical institutions, increase social respect for medical workers, attract more people to participate in the tiered diagnosis and treatment system, and establish a mechanism for balancing the interests of upper-level and lower-level medical institutions.

Regarding the public, based on attention (from high to low), the interest demands can be divided into five categories:

(1) Safety, high efficiency and independent rights of medical services; the specific demands are shown in Appendix10 Table 8 (Q18, Q7, Q5, Q11, Q10, Q6, Q9, Q19, and Q16).

(2) Medical expenses; the specific demands are shown in Appendix10 Table 8 (Q2, Q3, Q22, Q1, Q29, Q28, and Q4).

(3) Medical care experience and respect reception; the specific demands are shown in Appendix10 Table 8 (Q20, Q24, Q25, Q26, Q23, Q27, and Q30).

(4) Raising the capacity in primary medical service; the specific demands are shown in Appendix10 Table 8 (Q8, Q13, Q15, Q21, Q17, Q14, and Q12).

(5) Supporting medical health services; the specific demands are shown in Appendix10 Table 8 (Q31, Q32, and Q33).

The survey results indicate that the majority of the public do not know about the systems of primary initial diagnosis and dual referral and they believe that the system of tiered diagnosis and treatment greatly limits patients' independent choices of medical services and that primary medical institutions are short of both doctors and medicines. In the long run, the public do not trust primary medical institutions and thus form a habit of visiting large-scale hospitals for initial diagnosis and medical services, which leads to the overcrowding in large hospitals, long waiting time in both outpatient and inpatient departments and low efficiency of medical resource turnover. Therefore, the public pays the highest attention to safety, high efficiency and

independent rights of medical services.

The key to meet their interest demand is to strengthen the allocation of medical resources and raise the service capacities in primary medical institutions. Primary medical institutions should proactively respond to government's call of tiered diagnosis and treatment, make full use of the advantages of government-dominated medical partnerships, clearly position themselves, aim at providing treatment, rehabilitation and nursing service for patients with chronic diseases, convalescents, gerontal patients, and patients with late-stage cancer whose diagnosis is clear and conditions are stable. In addition, they should seek for the guidance in talents, technologies and management from upper-level medical institutions, ensure the establishment and smooth of green channels for referral, simplify the procedures of referral, improve patients' experience of medical care, raise patients' satisfaction, guarantee the efficiency, high efficacy and continuity of treatment and rehabilitation. Only in these ways can they gradually improve the medical services at grassroots levels and promote the implementation of tiered diagnosis and treatment.

Regarding enterprise employees, based on attention (from high to low), the interest demands can be divided into two categories:

(1) Individual development; the specific demands are shown in Appendix10 Table 10 (Q1 and Q2).

(2) Government's policy support and enterprise development; the specific demands are shown in Appendix10 Table 10 (Q15, Q16, Q14, Q12, Q13, Q3, Q5, Q6, Q9, Q7, Q10, Q11, Q4 and Q8).

The survey results reflect that, among the stakeholders of tiered diagnosis and treatment, enterprise employees obtain the lowest overall score, over 70% of them consider that enterprises' participation in tiered diagnosis and treatment is relatively low and the majority of employees think that enterprises are only subject to an average or lower influence of the system of tiered diagnosis and treatment or this system only exerts an average or lower influence on enterprises. However, as an important part in the implementation of tiered diagnosis and treatment and an essential link in medical activities, enterprises provide medicines, consumables and medical devices for the medical work. As employees' participation in and recognition and interest demands of the system of tiered diagnosis and treatment may be affected by their awareness of this system, over 70% of employees are relatively or completely unfamiliar with this system and no respondent in this survey has received any special training of tiered diagnosis and treatment organized by his competent department or enterprise while less than 50% of

employees can correctly choose the definition of tiered diagnosis and treatment.

Regarding employees' interest demands, the competent departments should actively organize training sessions for studying relevant policies of tiered diagnosis and treatment, strengthen policy guidance, offer more policy supports and preferential policies and improve employees' salaries and welfare so as to raise enterprises' cognition of tiered diagnosis and treatment, arouse their enthusiasm in participating in tiered diagnosis and treatment and increase enterprises' income.

## **Chapter 7: Conclusion**

### **7.1 General Contributions**

Based on the stakeholder theory, this thesis uses case study and questionnaire survey to compare the similarities and differences of three representative medical partnerships in Nanjing and select the core stakeholders of tiered diagnosis and treatment. In addition, this thesis also analyzes the cognition, recognition, interest demands and suggestions of tiered diagnosis and treatment, providing advice for the tiered diagnosis and treatment system as well as serving as a reference for the research on such system in other capital cities that share similar situations with Nanjing.

Ten years have passed since the proposal of tiered diagnosis and treatment in 2009 and the government has constantly introduced policies to advance this system. Guided by these policies, all regions proactively explore the models of medical partnerships, medical communities, alliances of specialized departments and telemedicine to promote the tiered diagnosis and treatment. According to this research, however, the results are not the desired. The three surveyed medical partnerships in Nanjing are established based on the model of “government appointment plus voluntary association”. The government-appointed medical partnerships can quickly achieve unified management of human resources and properties, which contributes to their stability. However, most medical partnerships formed through voluntary association are connected through a cooperative relationship and their stability cannot be ensured. Medical partnership is one of the methods to advance the tiered diagnosis and treatment system, which is a reasonable form of medical care. In boosting the construction of medical partnerships, at the same time, the government should enhance supervision to prevent medical partnerships from developing into a tool for competing for patients with large hospitals.

Through expert questionnaires and Mitchell score-based table, this research determines the core stakeholders of tiered diagnosis and treatment, which include health administrative departments, medical insurance departments, medical staff working at upper-level medical institutions, the public (patients, dependents of patients and residents), medical staff working at primary medical institutions, and companies. Based on the questionnaires of core stakeholders, it is found that governmental staff and employees of medical institutions show higher cognition

of tiered diagnosis and treatment than enterprise employees and the public, whose degree of familiarity with tiered diagnosis and treatment is lower than 10%. All core stakeholders generally have a relatively low satisfaction of the implementation of tiered diagnosis and treatment and they consider the necessity to implement the tiered diagnosis and treatment system mainly from the perspectives of medical resource allocation, medical care habits of the public and rights of independent medical care. Governmental departments pay the greatest attention to the reasonable allocation of medical resources, orderly medical treatment, and efficient utilization of medical resources. And the medical institutions and enterprise employees care most about individual development while the public focus on safety, high efficiency and their rights to select medical services.

China still has a long way to go in advancing the system of tiered diagnosis and treatment. To advance this system, efforts should be made to enhance publicity and education as well as guide all core stakeholder to participate. The functional positioning of medical institutions should be taken as a basis to reasonably optimize the allocation of medical resources and reduce the waste of medical resources. Commercial capitals should be introduced to promote the development of private medical institutions, constantly improve the medical security mechanisms, diversify the types of medical insurance, accelerate medical information construction, loosen control over medical workers' independent practice, raise medical workers' social status and salary, construct medical sharing platforms and use medical resources in a more efficient way.

## **7.2 Specific Contributions**

Based on the work developed, we present the following recommendations for promoting the tiered diagnosis and treatment:

### **7.2.1 Reasonably optimizing the allocation of medical resources based on functional orientation**

At present, the allocation of medical resources in China is unreasonable and such resources are mainly concentrated in developed regions and large-scale comprehensive medical institutions while remote regions and primary medical institutions are suffering from shortages in this regard. The setup of medical institutions should be reasonably planned based on the population and density of medical resources of a certain region. The blind expansion of large-



scale hospitals should be strictly controlled through policies and supervision while the transfer of quality resources to primary and remote regions should be encouraged through policy support and guidance. Based on regional characteristics, tiered diagnosis and treatment, functional orientation and the public demands, we should advance the construction of national, provincial and county-level medical circles in China by reasonably learning from the experience of the three-level medical circles in Japan.

Mainly composed of key national Grade III hospitals, national medical centers undertake the construction of national key clinical specialized departments, define diagnosis and treatment for critical illness and difficult miscellaneous diseases throughout the whole country, keep up with international medical and technological frontiers, proactively roll out new clinical technologies and business, develop core specialized departments, build characteristic brands and core competitiveness for hospitals and give play to the advantages of key disciplines.

Mainly comprising key provincial Grade III hospitals, provincial medical centers construct provincial centers for special diseases and key specialized departments, provide diagnosis and treatment for critical illness and difficult miscellaneous diseases within the province, and establish referral channels between provincial centers and their counterparts at the same level, between provincial centers and national centers, as well as between provincial centers and county-level centers.

Mainly consisting of county-level leading hospitals, county-level medical centers develop key county-level specialized departments and leading disciplines, as well as undertake the referral of patients with critical illness and difficult miscellaneous diseases in the county. Grade II hospitals in urban areas should be re-positioned based on public demands. They can develop specialized departments through the counterpart-assistance from Grade III hospitals so that they can be transformed into specialized hospitals.

Alternatively, they can also be transformed into rehabilitation care centers, sterilization and supply centers and health examination centers according to the demands of tiered diagnosis and treatment. In the early stage, excessive governmental funds have been invested in the construction of hardware in primary medical institutions, neglecting the cultivation of and compensations for medical workers. This leads to primary medical workers' low working enthusiasm and patients' distrust of primary medical levels and the overcrowding in large hospitals. Therefore, primary medical institutions should be provided with proper platforms for training general practitioners and more investments should be put in education to raise primary medical workers' professional and technological levels and create more opportunities for

further learning. Multi-level and diversified training of general practitioners' theories and skills should be proactively carried out on a constant basis so that primary medical workers can always be updated with cutting-edge philosophies of general practice. Additionally, the government should continuously invest more in the construction of soft power in primary medical institutions, guide and encourage primary medical institutions to develop characteristic specialized departments of traditional Chinese medicine, community rehabilitation, chronic diseases, common diseases and senile diseases, encourage the development of rehabilitation nursing care units, and proactively advance the system of family doctors (see Figure 7-1).

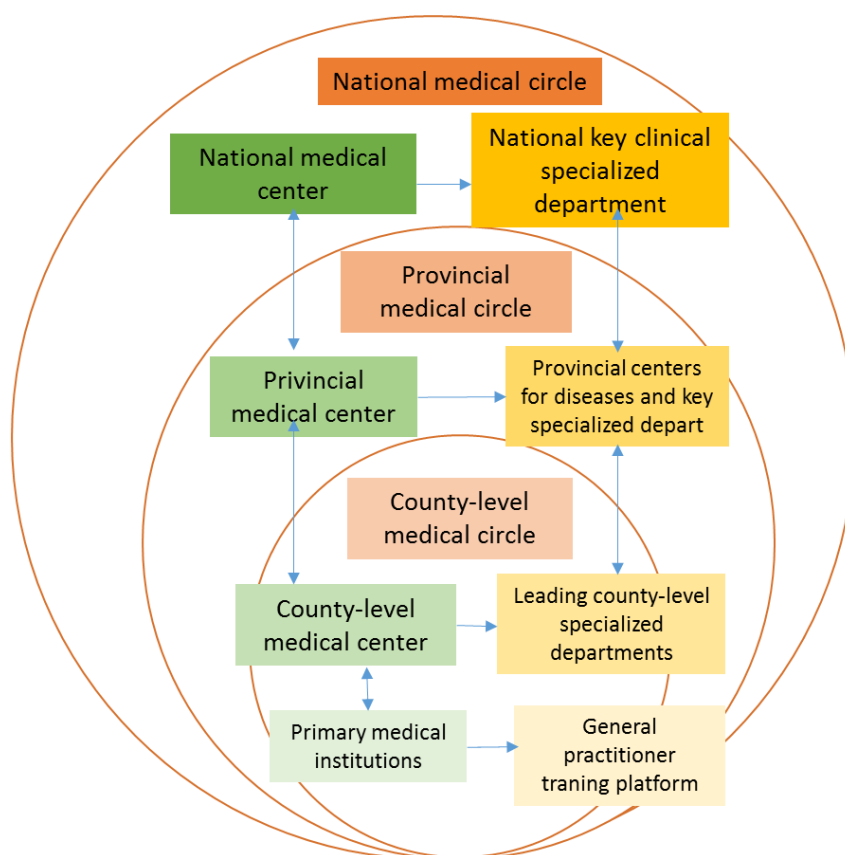


Figure 7-1 The three-level medical circles based on functional orientation

### 7.2.2 Reasonably introducing commercial insurance mechanisms and improving medical security systems

Dominated by the government, China's medical security systems have basically covered all people. With the rapid rise of medical expenses, the accelerated aging of population and unsound supervision mechanisms, China is faced with such problems as the shortages and waste of medical resources, increased financial pressure and excessive medical insurance expenses. Although medical expenses in the US remain high, the commercial medical insurance systems

of the country merit China’s reference. In the US, the medical activities of medical institutions, doctors and patients are all subject to the supervision of insurance institutions. Medical institutions signing agreements with insurance companies become the designated medical institutions for the insured and the insured can also seek for medical services from the medical institutions whose doctors have signed agreements with insurance companies; after the insured sign agreements with insurance companies, if they suffer from diseases, insurance companies will coordinate and undertake the medical expenses in accordance with the terms and conditions stipulated in the contract they have signed; against this backdrop, medical institutions provide treatment sites and medical devices for doctors to offer diagnosis and treatment services to patients to achieve the goals of transparent diagnosis, effective treatment and low recurrence rate; after the treatment, insurance companies will check and clear the medical expenses (Wang, 2016).

Insurance companies will survey the reasons for high recurrence rates and excessive medical expenses: if the reasons lie in doctors, they will terminate the contracts they have signed with the doctors and will consider whether continue hiring them; and if the patients themselves are attributed, they will also terminate the contracts they have signed with the patients, as shown in Figure 7-2 (Wang, 2016).

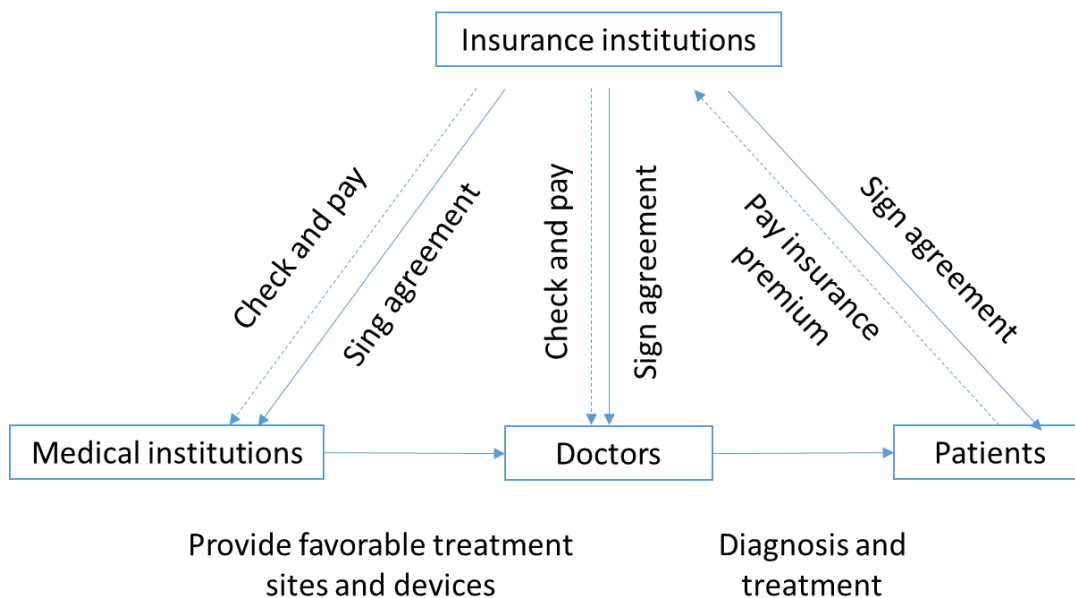


Figure 7-2 The stakeholder-based commercial insurance model in the US

Source: Wang (2016)

Standing at a primary stage, China’s commercial medical insurance can be categorized into supplementary medical insurance but commercial medical insurance occupies an important

position in many developed countries. Commercial medical insurance can be used to collect social funds, create more sources of medical expenses, relieve government's financial pressure, provide patents with diversified and customized insurance services and deal with the problem of single primary medical insurance service. As third-party institutions, commercial medical insurance institutions will strictly check the medical service quality to reduce over-treatment, decrease the excessive waste of medical resources and contain the surge of medical expenses. Therefore, the Chinese government should ease the control over commercial insurance to advance the development of commercial medical insurance companies, while in turn, against the backdrop of the tiered diagnosis and treatment system, insurance companies should provide diversified and customized types of insurance, for example, the long-term care insurance and the rehabilitation insurance, as well as monitor the process of medical service and control the quality of medical service and expenses as third-party review organizations.

### **7.2.3 Accelerating medical information construction and raising medical information levels**

Medical information technologies can dynamically monitor clinical data, select and analyze medical service data in a timely manner. In Nanjing, no information platform has been constructed yet to link the information systems of medical institutions in the city and conduct real-time monitoring. The medical data monitoring mainly relies on medical institutions' monthly and annual reports submitted to the national medical statistical system and the statistics mainly include their basic information and the data about their staffing, income and expenditure. These medical data are time-delay to some extent and their reliability fails to be monitored. In addition, there is no statistical module for relevant indicators of tiered diagnosis and treatment.

An effective medical information network can improve the quality of data monitoring and give timely feedback on problems. Connecting the medical information networks between upper-level and lower-level medical institutions and among different regions as well as constructing advanced electronic individual health records can promote the transfer of medical information, provide more comprehensive information about the disease and inspection results of patients to doctors so that they can offer timely diagnosis and treatment services, raise medical care efficiency and reduce time length of treatment. The constant improvement of medical information networks can boost the development of telemedicine, provide guarantee for the medical development in remote areas, share medical resources and raise the efficient utilization of medical resources.

Regarding medical information construction, the government should first integrate the existing medical information systems, formulate unified standards and norms, and ensure data security so that different departments can obtain relevant medical information in a timely manner and provide data support for industrial monitoring and policy making. The government should take the lead in building the three-level medical information platforms to provide real-time data support for medical health policy making and monitoring while the county-level platforms should complete their basic tasks, connect the medical systems of various medical institutions in the counties and collect the basic health and medical data and records of the public. The provincial platforms should link all county-level platforms in the provinces to realize the real-time access to, and the sharing, statistics and analysis of the data of county-level platforms. The national platforms should connect all provincial platforms to achieve the real-time access to, and the sharing, statistics and analysis of the data of provincial platforms.

During the construction of medical information platforms, meanwhile, efforts should be made to enhance the construction of medical information security and platforms at all levels required to timely spot and address problems in all links to strengthen hospitals' information management capacity. In hardware construction, at the same time, more attention should be paid to strengthening the cultivation of medical information talents and hospitals at all levels should offer medical information education for medical workers and set up sound mechanisms for medical information talent training while medical universities should strengthen the teaching of medical information, reinforce medical basis and information technology, and cultivate reserve talents of medical information (see Figure 7-3).

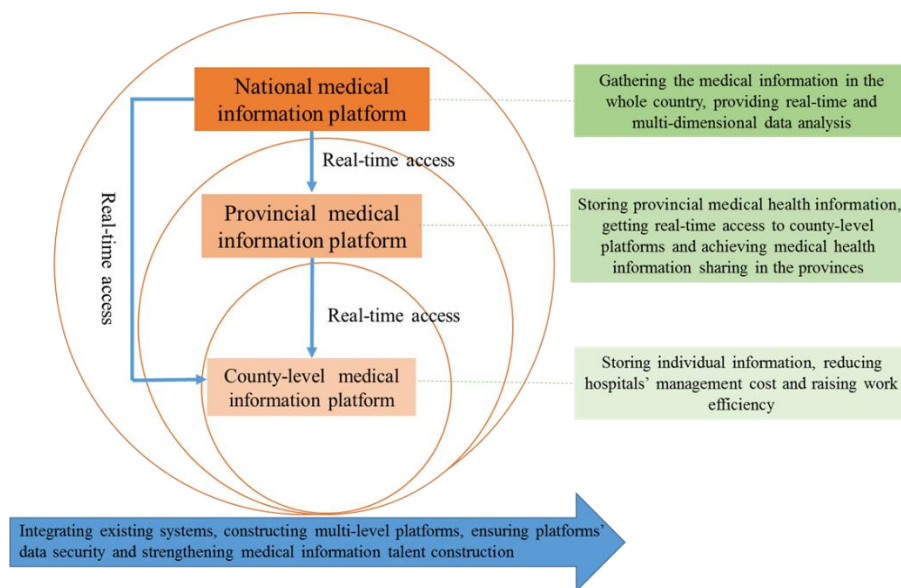


Figure 7-3 The construction of three-level medical information platform

#### **7.2.4 Lifting the restriction on medical workers' independent practice and advancing the development of sharing medicine**

In China, public medical institutions play a dominant role in the medical field. They are categorized as public institutions and their employees are under the staffing system of government affiliated institutions. The staffing management can ensure medical workers' stability in employment and their retirement remuneration, however, with the development of market economy in China, this staffing system exerts greater restrictions on the development of medical service market. As the development of private hospitals is unstable, few permanent medical workers within the system are willing to give up their stable jobs, leading to private hospitals' difficult development. As doctors are important medical resources, their independent practice is beneficial to reasonably utilizing medical talent resources. In developed countries, doctors can sign contracts with medical institutions so that they are able to conduct independent practice in several medical institutions at the same time, avoiding a certain medical institution's monopoly in medical talents. The majority of China's celebrated doctors are included in the staffing system of government affiliated institutions and they are monopolized by public hospitals. In recent years, although a register system for multi-site practice for doctors has been promoted by the government, the annual verification of medical institutions is mainly based on the number of doctors registered in major practicing institutions. It is very difficult for doctors in public medical institutions to change their major practicing institutions, thus it is hard for medical institutions, particularly the private ones, to hire the highly qualified medical talents from public medical institutions. Medical workers expect to match their salaries with labor and receive respect and understanding from the society. Restricted by the human resource management of government affiliated institutions, doctors undertake intensive work but receive low salary, which fails to truly reflect their value; and medical troubles occur frequently. Only by realizing independent practice for doctors can we form a reasonable market price for them and reflect the value of their labor.

With the loosening of control over doctors' independent practice, platforms are needed by doctors to provide them with the information of medical service demands to reduce the waste of medical resources. The hardware facilities in primary medical institutions and private medical institutions have been greatly improved in recent years, but many of them remain idle. The sharing medical platforms can act as third-party platforms and integrate relevant information and resources of doctors, medical institutions and patients, including the time-length of doctors' service outside their major practicing institutions, medical institutions'

diagnosis and treatment sites and devices, as well as patients' diagnosis and treatment demands. Through the sharing medical platforms, doctors can make use of their spare time to provide services for patients; patients can look for doctors or even well-known specialists home and abroad as well as choose treatment sites; and medical institutions can make use of idle resources such as operation rooms, inspection equipment and wards to raise the resource utilization. With the loosening control over medical workers' independent practice, besides doctors, other medical technicians such as nurses and pharmacists can also gradually register to get into the platforms.

On these platforms, doctors can not only provide medical services but also set up their own medical teams to offer continuous treatment services for patients. Patients can also seek for nurses and pharmacists for professional services or even door-to-door services. Chinese patients visit large-scale hospitals for initial diagnosis and treatment services because of the high medical levels of these hospitals, which are manifested in medical workers' capability and hospitals' hardware facilities. If doctors with high treatment levels and hardware facilities are integrated into one sharing platform, patients will not overcrowd the outpatient or inpatient department waiting for their treatments in the hospital. The development of medical sharing is of great significance to reasonably allocating medical resources and advancing tiered diagnosis and treatment. Of course, the development of medical sharing also requires policy support and supervision from the government (see Figure 7-4).

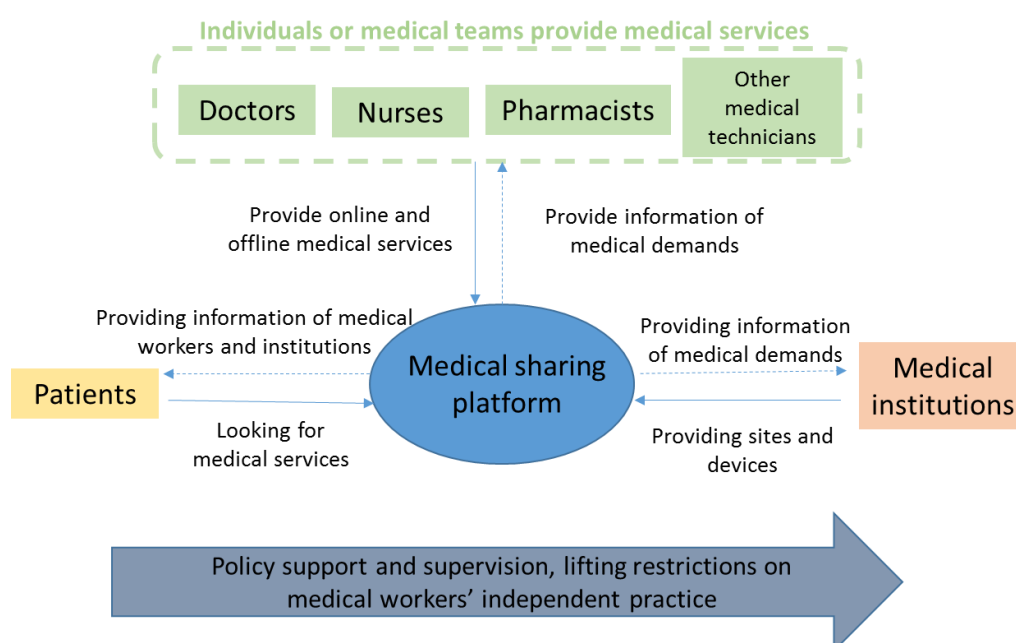


Figure 7-4 Medical sharing platform

### **7.2.5 Encouraging private medical institutions' participation in the construction of tiered diagnosis and treatment**

At present, the policy of tiered diagnosis and treatment imposes requirements on public medical institutions but not on the private ones. In recent years, the number of private medical institutions has soared but it is difficult for them to attract and retain highly qualified medical talents. And with the exposure of medical events in Putian (Medical events in Putian refer to a medical accident that attracted the attention of Chinese netizens on the Internet in 2016. Wei Zexi, a 21-year-old student at Xidian University, died of synovial sarcoma in 2016. He once wrote about a treatment experience on Zhihu.com before his death. He wrote that, he once searched for how to treat his disease on Baidu.com (a search engine in China). According to search results from Baidu.com, he found that a hospital in Beijing has a biologic immunotherapy. So, he went there for treatment. Unfortunately, his health condition was even worse after treatment, finally causing his death. After that, the social media reported that the technology used by that hospital, has been eliminated in the United States already. The department of that hospital where Wei Zexi received treatment, was actually contracted by Putian illegal private hospitals secretly. Putian hospital mainly refers to illegal private hospitals run by people from Putian city and its surrounding areas in China), the public shows low trust on private medical institutions, causing great waste of medical resources. Private hospitals can be divided into profit-making ones and non-profit ones. Currently, in China, there are only a few private non-profit medical institutions, but such institutions constitute an important part of the medical services in other countries. The development of private non-profit medical institutions requires policy support from the government. Thus the government should encourage them to develop medical care of primary levels and in remote areas and provide tax preference for their medical investment so as to attract more investments from social capital. Additionally, the government should treat private non-profit medical institutions and the public ones on an equal footing so that both of them can enjoy the same policy support. And the government should also formulate and improve the supervision mechanism for private non-profit medical institutions to ensure their non-profit nature. Private profit-making medical institutions should take the policy of tiered diagnosis and treatment as an opportunity to select their market positioning, stagger their departmental layout compared with the public medical institutions, invest more in the construction of such specialized departments as gynecology and pediatrics, medical cosmetology, physical examination and rehabilitation, develop the layout for primary medical market, provide improved high-end medical services featuring greater convenience and user-



accessibility, such as the 24-hour door-to-door service of family doctor. Nowadays, many primary public medical institutions encourage residents to sign contracts with family doctors, but considering the number of primary general practitioners and their medical service quality, timely door-to-door services of family doctor fail to be realized. The proactive efforts to carry out the joint construction of advantageous departments with public medical institutions and to promote private medical institution to participate in the tiered diagnosis and treatment system can make up the shortage of governmental investment, improve the weak state of primary medical care and provide patients with multi-level services (see Figure 7-5).

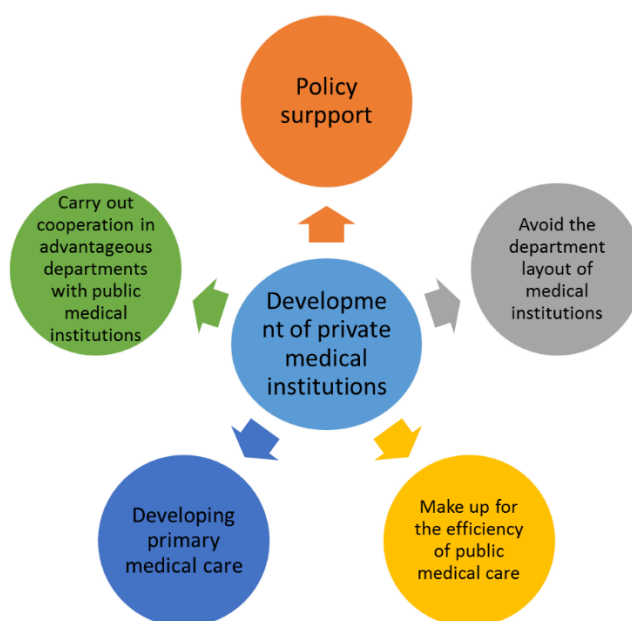


Figure 7-5 Promoting the development of private medical institutions

### 7.2.6 Enhancing publicity and guidance and promoting stakeholders' participation in tiered diagnosis and treatment

The survey results show that, among the core stakeholders, the participation in and cognition of tiered diagnosis and treatment of governmental staff and medical institutions' employees are higher than that of the public and enterprise employees. However, the implementation of this system will be impossible without the participation of all stakeholders. Patient and enterprises' low participation in the tiered diagnosis and treatment system is primarily resulted from their low cognition of this system. Consequently, governmental departments should pay attention to the publicity of tiered diagnosis and treatment. Besides the traditional media such as network news broadcast and newspaper, many other ways, for example, WeChat public accounts, massed community learning, lectures held by medical practitioners, and door-to-door lecturing by family doctors, can be adopted to raise the public

cognition of tiered diagnosis and treatment and arouse their enthusiasm. Superior competent departments may organize enterprises to intensively learn about the system of tiered diagnosis and treatment. The publicity and education for governmental staff and medical institutions' employees cannot be ignored, which can be achieved through massed learning. Disease prevention is a link before disease treatment. In the tiered diagnosis and treatment system, disease treatment for the public and enterprise employees can only be undertaken by medical institutions. However, the government, medical institutions, the public and enterprises can all proactively participate in disease prevention. Effective disease prevention can greatly relieve the pressure of using up medical resources, reduce medical expenses and promote the implementation of tiered diagnosis and treatment. As the system of tiered diagnosis and treatment is greatly advanced at the national level, various services such as advance prevention, health improvement, subsequent rehabilitation and deathbed care will become more accessible and valuable. Governmental departments should effectively implement top-level design, link up tiered diagnosis and treatment with disease prevention, improve relevant laws and regulations, specify the responsibility of governmental departments at all levels, medical institutions, the public and related enterprises as well as pool more efforts in publicity and supervision to provide laws for people to follow in the aspects of prevention and security. Medical institutions at all levels should proactively cultivate talents of health education, and conduct publicity of relevant knowledge of disease prevention and treatment as well as healthy life habits among patients. In particular, family doctors play a crucial role in health education and publicity. Enterprises should take this as an opportunity to conduct in-depth survey and research, pinpoint target markets, independently develop health products, or cooperate with higher institutions and scientific institutes to innovate products, proactively participate in public benefit activities to increase brand recognition and provide the public with guidance in healthy life and correct philosophies of consumption. The public should strengthen their awareness of health, actively participate in disease prevention, form healthy life habits, proactively acquire some knowledge of disease prevention, master the elementary knowledge of some common diseases and chronic diseases, and reasonably select medical institutions when diseases occur (see Figure 7-6).



Figure 7-6 Strengthening the publicity and guidance of tiered diagnosis and treatment

### 7.3 Limitations

Firstly, this thesis mainly surveys three representative medical partnerships in Nanjing with limited number of questionnaires, leading to limitations in the conclusions. Secondly, this thesis mainly analyzes the core stakeholders' cognition, recognition and interest demands of tiered diagnosis and treatment and does not analyze other stakeholders. Therefore, the whole research system of stakeholders of tiered diagnosis and treatment needs to be improved. Thirdly, relevant suggestions on advancing the tiered diagnosis and treatment system put forward in this thesis have not been verified.

### 7.4 Research prospects

First of all, on the basis of increasing the sample capacity, further research on the tiered diagnosis and treatment system should be conducted, expanding the range of research objects to the whole Jiangsu Province. Next, an in-depth analysis of other stakeholders should be conducted. In addition, the implementation measures for advancing tiered diagnosis and treatment should be further specified and a systematic evaluation system should be constructed. Finally, an analysis on the statistics collected before and after the suggestions are adopted should be carried out to evaluate the effectiveness and maneuverability of these suggestions.

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## Appendix

### Appendix 1: Related policies on tiered diagnosis and treatment promulgated by Chinese governments, etc.

Table 1: Related policies on tiered diagnosis and treatment promulgated by Chinese governments

Source	Name of Policies	Contents
the CPC Central Committee and the State Council, 2009	Opinions of the CPC Central Committee and the State Council on Deepening Medical and Health Care System	To guide general diagnosis and treatment down to grass-roots medical institutions, and gradually achieve the goal of the initial diagnosis to be conducted in community health centers, classification of medical treatments, and dual referral
General Office of the State Council, 2015a	Guiding Opinions on Promoting Tiered Diagnosis and Treatment System	By 2017, the tiered diagnosis and treatment system will be gradually improved, the labor division and coordination system of medical institutions will basically take shape, high-quality medical resources will be guided down to grassroots level in an orderly and effective way, and the grassroots medical personnel with general practitioners as the key will be strengthened. The utilization efficiency of medical resources and general benefits will be further improved, the proportion of diagnosis and treatment in grassroots medical institutions to the total diagnosis and treatment will obviously arise in amount, and the treatment order will be more rational and standard. By 2020, the tiered diagnosis and treatment service capability will be comprehensively enhanced, the security system will be gradually perfected, and a medical service system with reasonable layout, proper scale, optimized hierarchy, clear obligation, complete function and high efficiency will be basically built. The tiered diagnosis and treatment model will gradually take shape, featuring initial diagnosis

Xinhua News Agency, 2016	the 13 <sup>th</sup> Five-Year Plan for Economic and Social Development of the PRC	<p>in communities, two-way referral among hospitals, differentiation between chronic and acute diseases, and interconnectivity between high and low levels of medical institutions, and a tiered diagnosis and treatment system in line with the national situation of China will be basically established.</p> <p>Taking comprehensively establishing tiered diagnosis and treatment system and enhancing grassroots medical service capability as the highlight, the government will improve service network, operation mechanism and incentive mechanism, adopt differentiated medical insurance support and price policy, and form a scientific and reasonable treatment order, i.e. basically achieving initial diagnosis in communities, two-way referral among hospitals, interconnectivity between high and low levels of medical institutions and differentiation between chronic and acute diseases.</p>
the CPC Central Committee and the State Council, 2016	“Health China 2030” Development Plan	<p>We will improve contracted family doctor services, and establish a perfect tiered diagnosis and treatment system. We will form a reasonable treatment order featuring initial diagnosis in communities, two-way referral among hospitals, interconnectivity between high and low levels of medical institutions and differentiation between chronic and acute diseases, and improve the service chain of treatment-recovery-long-term-care. We will guide tertiary public hospitals to reduce general clinic and focus on treatment of critical, difficult and acute diseases. We will improve the labor division and coordination patterns among medical partnership, hospital group and others to enhance the overall performance of service system.</p>
The State Council of the PRC, 2017b	Planning of Deepening the Medical and Health System Reform in the 13 <sup>th</sup> Five-Year Plan	<p>The first key task is to establish a scientific and rational tiered diagnosis and treatment system. Contracted family doctor services should be taken as an important means to implement various forms of tiered diagnosis and treatment system based on their actual situation, with an aim to promote the formation of a new medical order featuring initial diagnosis at the grassroots level, two-way referral among hospitals, differentiation between treatment of acute and chronic diseases, and cooperation between high-level and low-level medical institutions. By 2017, the tiered diagnosis and treatment policy system will be gradually improved, and more than 85% of the cities</p>

<p>General Office of the State Council of PRC, 2017b</p>	<p>the Key Tasks for Deepening the Medical and Health System Reform in 2017</p>	<p>will have carried out pilot projects. By 2020, the tiered diagnosis and treatment model will be gradually formed, and the corresponding system in line with national conditions of China will be basically established.</p>
<p>the Health Department of the PRC, &amp; the Traditional Chinese Medicine Bureau of the PRC, 2017</p>	<p>Action Plan for Further Improvement of Medical Services (2018-2020)</p>	<p>It is required to summarize and promote local successful experiences, further expand the scope of the pilot, and extend the tiered medical treatment pilots and contracted family doctor services to more than 85% of the cities in China.</p> <p>From the year of 2018, medical institutions should establish an appointment system for diagnosis and treatment, a telemedicine system, a clinical pathway management system, a mutual recognition system for inspection and examination results, and a medical social worker and volunteer system. The quality of primary-level medical care will be improved and the development of primary-level medical service system will be strengthened by establishing medical partnerships.</p>
<p>the Health Department of the PRC, &amp; the Traditional Chinese Medicine Bureau of the PRC, 2018</p>	<p>Opinions on Insisting on People's Health as the Center to Promote High Quality Development of Medical Services</p>	<p>It requires the advance of tiered diagnosis and treatment system based on the development of medical partnerships and contracted family doctor services.</p>
<p>General Office of the State Council of the PRC, 2018a</p>	<p>the Key Tasks of Deepening the Medical and Health System Reform in the Second Half of 2018</p>	<p>It requires the promotion of the construction of tiered diagnosis and treatment system in an orderly manner, encourages non-government funded medical institutions, rehabilitation institutions and nursing institutions to participate in the construction of medical partnerships, and promotes the construction of medical partnerships and telemedicine services. It guides local governments to improve the medical service pricing system and medical insurance payment policies of different levels of medical institutions. The differences of reimbursement at different levels of medical institutions will be widened to guide patients to go to hospitals corresponding to their illness, and promotes contracted family doctor services.</p>

Table 2: Policies of tiered diagnosis and treatment issued by Jiangsu province and Nanjing city from 2009 to 2018

Document	Date	Issuing Department
Implementation Opinions of Jiangsu Provincial Party committee and Jiangsu Provincial Government on Deepening Medical and Health System Reform	2009/7/24	CPC Jiangsu Committee; Jiangsu Provincial Government
Medical Institutions Planning of Nanjing (2009-2015)	2009/2/5	Nanjing Health Bureau
Implementation Opinions on Promoting Equalization of Basic Public Health Service	2009/7/29	Jiangsu Health Department; Jiangsu Financial Department; Jiangsu Population and Family Planning Commission
Opinions on Improving and Developing New Rural Cooperative Medical System	2009/9/17	Jiangsu Health Department; Jiangsu Financial Department; Jiangsu Civil Affairs Department; Jiangsu Agriculture Commission; Jiangsu Traditional Chinese Medicine Bureau
Implementation Opinions on Strengthening Medical Talent Team Building	2010/5/17	Jiangsu Development and Reform Commission; Jiangsu Financial Department; Jiangsu Human Resources and Social Security Department; Jiangsu Education Department; Jiangsu Public Sectors Reform Commission
Implementation Opinions of the Nanjing Municipal Government on Deepening Medical and Health System Reform	2010/2/24	CPC Nanjing Committee
Notification of Forwarding the Guiding Opinions on Comprehensive Reform of Grassroots Medical Institutions in Nanjing	2011/5/27	General Office of CPC Nanjing Committee; General Office of Nanjing Municipal Government
Implementation Opinions of the Provincial Government on Establishing General Practitioner System	2011/11/3	Jiangsu Provincial Government
Notification of the General Office of Provincial Government to Forward Implementation Opinions of the Provincial Development and Reform Commission, Provincial Health Department and Other Departments on Further Encouraging and Guiding Social Capital to Run Medical Institutions	2011/4/23	Jiangsu Provincial Government
Notification of Forwarding Guiding Opinions of Ministry of Health of the PRC, National Development and Reform Commission and Ministry of Finance on Promoting Reform of New Rural Cooperative Medical Treatment Method	2012/6/6	Jiangsu Health Department; Jiangsu Development and Reform Commission; Jiangsu Financial Department; Jiangsu Commodity Price Bureau

Notification of Printing and Distributing Implementation Plans for the Pilot Work of Some Major diseases be Paid according to Types of Diseases in Urban and Town Basic Medical Insurance	2012/8/10	Jiangsu Human Resources and Social Security Department; Jiangsu Health Department; Jiangsu Civil Affairs Department; Jiangsu Commodity Price Bureau
Notification of the Nanjing Government to Cancel Free Medical Service in Public Organizations	2012/11/29	Nanjing Municipal Government
Notification of the Jiangsu Provincial Health Department to Print and Distribute Opinions on Establishing Intensive Appointment Treatment Service Platform and Promoting Appointment Diagnosis and Treatment	2012/2/16	Jiangsu Health Department
Implementation Opinions on Promoting Family Doctor Service	2012/4/27	Nanjing Health Bureau
Implementation Opinions on Comprehensive Reform of Some District Public Hospitals	2013/10/15	Nanjing Municipal Government
Implementation Plan of Hospital Distribution and System Optimization in Nanjing (2013-2015)	2013/3/10	Nanjing Health Bureau
Notification of the CPC Nanjing Committee and Nanjing Municipal Government to Forward Work Plan of Optimization of Medical Resources Allocation in Nanjing	2014/11/18	General Office of CPC Nanjing Committee; General Office of Nanjing Municipal Government
Implementation Opinions of the Nanjing Municipal Government on Deepening Health Care System Reform	2015/4/9	General Office of CPC Nanjing Committee
Notification of Offering Grassroots Referral Appointment Service and Promoting Tiered Diagnosis and Treatment	2016/11/16	Jiangsu Health and Family Planning Commission
Notification of Forwarding the Notification of National Health and Family Planning Commission of the PRC and the State Traditional Chinese Medicine Administration of the PRC to Promote Trial Work of Tiered Diagnosis and Treatment	2016/10/13	Jiangsu Health and Family Planning Commission; Jiangsu Traditional Chinese Medicine Bureau
Notification of Printing and Distributing the Implementation Plan of Online Settlement for New Rural Cooperative Medical Treatment	2016/7/29	Jiangsu Health and Family Planning Commission; Jiangsu Financial Department
Notification of the Jiangsu Health and Family Planning Commission, Education Department, Development and Reform Commission and Human Resources and Social Security Department to Send Rural Students to Medical Schools for Free	2016/6/2	Jiangsu Health and Family Planning Commission; Jiangsu Education Department; Jiangsu Development and Reform Commission; Jiangsu Human Resources and Social Security Department

Notification to Print and Distribute the Basic Functional Norms of Information System of General Health Businesses in Grassroots Medical Institutions in Jiangsu (2016)	2016/5/30	Jiangsu Health and Family Planning Commission
Notification of Implementing Comprehensive Reform of Drug Price in Primary Public Hospitals in Nanjing	2016/11/29	Nanjing Commodity Price Bureau; Nanjing Health and Family Planning Commission; Nanjing Human Resources and Social Security Bureau; Nanjing Financial Bureau
Notification of Preparing for Drug Price Comprehensive Reform of Primary Hospitals and other Public Medical Institutions in Nanjing	2016/12/9	Nanjing Deepening Medical and Health System Reform Leading Group Office
Plan of Medical Institution Establishment for 13th Five-Year Plan of Nanjing	2017/1/4	General Office of Nanjing Municipal Government
Implementation Opinion on Promoting the Construction and Development of Regional Medical Associations in Nanjing	2017/8/14	Nanjing Deepening Medical and Health System Reform Leading Group Office
Planning of Medical and Health Service System in Nanjing from 2018 to 2020	2018/4/8	General Office of Nanjing Municipal Government
Implementation Opinions of the General Office of the Provincial Government on Reforming and Improving the Training and Incentive Mechanism for General Practitioners	2018/7/5	General Office of Jiangsu Provincial Government

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## **Appendix 2: The 1st round of expert consultation form for stakeholders engaged in tiered diagnosis and treatment, etc.**

Dear experts:

This consultation is to define the stakeholders engaged in the tiered diagnosis and treatment. Please tick your choice with “√” in the bracket.

Basic information of experts (please tick your choice with “√” in the bracket)

1. Gender: Male Female

2. Age:

3. Education:

Doctoral degree Master degree Bachelor degree College degree or others

4. Job category:

Medical staff

Managers of medical institutions

Administrative staff of Department of Health

Researcher

Others:

5. Working experience:

Less than 5 years 5-10 years

11-15 years 16-20 years 2 More than 20 years

6. Professional title:

None

Junior professional title

Medium-grade professional title

Senior professional title

Table 1: The 1st round of expert consultation form for stakeholders engaged in tiered diagnosis and treatment

	Options	Stakeholder or not	
		Yes	No
Government	Health administrative department Medical insurance department Department of finance Price department National Development and Reform Commission Food and drug Administration Industrial and Commercial Administration Public security organs, the Procuratorates and people's courts Managers of tertiary hospitals		
Public medical institution	Managers of second-class and specialized hospitals Managers of basic medical institutions Medical staff in tertiary hospitals Medical staff of second-class and specialized hospitals Medical staff of basic medical institutions		
Private medical institutions	Managers of medical institutions Medical staff Patients Dependents of patients Residents Drug supplier Suppliers of medical equipment and consumables Centre for disease control and prevention Blood supply institutions Commercial insurance institution Industrial association		
Media	Traditional media such as newspapers and news, etc. New media such as We-Media and online media, etc. Medical students Medical education institution Medical research institution Retail pharmacy Bank		

1.Are you familiar with tiered diagnosis and treatment system (Please tick your options with “√”):

very familiar ( )    more familiar ( )    general ( )    less familiar ( )

very unfamiliar ( )

2. Which is the basis of your choice? (Please tick your options with “√”):

practical experience ( )      theoretical analysis ( )      peer understanding ( )

intuition ( )

3. Please add in the blanks what you think are the stakeholders of tiered diagnosis and treatment system.

4. Do you think the above stakeholder candidates are appropriate? If not, please give suggestions for improvement.

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Source: Chen Lingli, 2017; Wang Qingbo, Hu Jia & Dai Tao, 2016; organized by the author

Dear experts:

This consultation is to define the stakeholders engaged in the tiered diagnosis and treatment. Please tick your choice with “√” in the bracket.

Basic information of experts (please tick your choice with “√” in the bracket)

1. Gender: Male      Female

2. Age:

3. Education:

Doctoral degree    Master degree    Bachelor degree    College degree or others

4. Job category:

Medical staff

Managers of medical institutions

Administrative staff of Department of Health

Researcher

Others:

5. Working experience:

Less than 5 years      5-10 years

11-15 years      16-20 years      2 More than 20 years

6. Professional title:

- None
- Medium-grade professional title
- Junior professional title
- Senior professional title

Table 2: The 2nd round of expert consultation form for stakeholders engaged in tiered diagnosis and treatment

Options	Stakeholders or not	
	Yes	No
The government		
Health Administrative Departmen		
Medical Insurance Department		
Department of Finance		
Price Department		
National Development and Reform Commission		
Food and Drug Administration		
Administration for Industry and Commerce		
Public security organs, the Procuratorates and people's courts		
Medical staff working at superior medical institutions		
Medical staff working at primary medical institutions		
Private medical institutions		
The public (patients, relatives of patients and residents)		
Companies (suppliers of drugs, medical equipment and consumables)		
Centre for disease control and prevention		
Blood supply institutions		
Commercial insurance institution		
Industrial association		
Media		
Traditional media such as newspapers and news, etc.		
New media such as We-media and online media, etc.		
Medical students		
Medical education institutions		
Medical research institutions		
Retail pharmacy		
Banks		
1.Are you familiar with tiered diagnosis and treatment system (Please tick your options with “√”):		
very familiar ( )	more familiar ( )	general ( ) less familiar ( )

very unfamiliar ( )

2. Which is the basis of your choice? (Please tick your options with “√”):

practical experience ( )      theoretical analysis ( )      peer understanding ( )

intuition ( )

3. Please add in the blanks what you think are the stakeholders of tiered diagnosis and treatment system.

4. Do you think the above stakeholder candidates are appropriate? If not, please give suggestions for improvement.

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Source: Wang, Hu, and Dai (2016); Chen (2017)

Table 3: Mitchell Score-based approach

Stakeholders	Authority			Legitimacy			Urgency			
	Weak	Normal	Strong	Weak	Normal	Strong	Weak	Normal	Strong	
The government	Health administrative department									
	Medical insurance department									
	Department of finance									
	Price department									
	National Development and Reform Commission									
	Food and Drug Administration									
	Administration for Industry and Commerce									
	Public security organs, the Procuratorates and people's courts									
	Public medical institutions	Medical staff at superior medical institutions								
		Medical staff at primary medical institutions								
Staff at private medical institutions										
The public (patients, dependents)										

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of patients and residents)  
The enterprises (suppliers of drugs,  
medical equipment and consumables)  
Centre for disease control and prevention  
Commercial insurance institution  
Industrial association  
Traditional media such as  
newspapers and news  
Media New media such as WeChat  
official accounts and  
Microblog.

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Source: Chen (2017); Sun (2017)



Dear Experts,

This consultation aims at grading the stakeholders engaged in tiered diagnosis and treatment from such three perspectives as authority, legitimacy and urgency to three grades: weak, normal and strong respectively. Such three grades correspond to the scores of 0, 50 and 100. Please tick your options with “√”.

Authority refers to the possibility of realizing one’ own will through coercive, utilitarian or normative means in spite of objections.

Legitimacy refers to generalized perception or assumption that the actions of an entity are desirable, proper or appropriate within some socially constructed system of norms, believes and values.

Urgency is mainly measured from two perspectives, the time sensitivity and the significance, in which the former refers to the sequence of priority of realizing the equity claim and the significance focuses on the effect on the tiered diagnosis and treatment whenever the claim is not fulfilled in time.

### Appendix 3: Questionnaire for government staff

Dear Sir/Madame:

With gradual national promotion and public attention on tiered diagnosis and treatment system, concerns have also been raised together with the aspiration of such a medical reform. To investigate more about tiered diagnosis and treatment system, we would like to learn from you about your thoughts for the purpose of healthy and steady enhancement of this system. This questionnaire will be executed anonymously without keeping any of your personal information. All the related information is only for research purpose, to which only the research staff can have access.

Please tick your options with “√”. In Group III, if you desire that the tiered diagnosis and treatment could fulfil one particular demand, then choose 5; in case of general concern, please choose 3; in case of absolute no concern, please choose 1.

<p>I . Personal Information (tick your options with “√”)</p> <p>1.Gender: <input type="radio"/> Male <input type="radio"/> Female</p> <p>2.Age: _____</p> <p>3.Education: <input type="radio"/> Doctor Degree <input type="radio"/> Master Degree  <input type="radio"/> Bachelor Degree <input type="radio"/> College Degree or below</p> <p>4.Job Category:  <input type="radio"/> Medical staff <input type="radio"/> Management staff at medical institutions  <input type="radio"/> Administrative staff of Department of Health <input type="radio"/> Researchers  <input type="radio"/> Others</p> <p>5.Title or not: <input type="radio"/> 1 No <input type="radio"/> 2 Yes (Please specify) _____</p> <p>6.Working Experience: <input type="radio"/> Less than 5 years <input type="radio"/> 5-10 years  <input type="radio"/> 11-15 years <input type="radio"/> 16-20 years <input type="radio"/> More than 20 years</p> <p>7.Professional title: <input type="radio"/> None <input type="radio"/> Junior professional title  <input type="radio"/> Intermediate professional title <input type="radio"/> Senior professional title</p>
<p>II . Cognition and Recognition of Tiered Diagnosis and Treatment</p> <p>1.Are you familiar with tiered diagnosis and treatment system:  <input type="radio"/> Extremely familiar <input type="radio"/> Very familiar <input type="radio"/> Familiar <input type="radio"/> Not very familiar <input type="radio"/> Not at all</p> <p>2.How did you get to know the tiered diagnosis and treatment system:  <input type="radio"/> Trainings by superior authorities  <input type="radio"/> Company training  <input type="radio"/> Traditional media such as CCTV news and newspapers</p>

- Mobile We-media such as Microblog and WeChat official accounts
  - Family members, friends and colleagues
  - Other sources (Please specify)
3. Have your institution already launched the implementation measures of the tiered diagnosis and treatment yet:
- Yes
  - No
  - Unclear
4. Have your institution offered trainings related to the tiered diagnosis and treatment:
- Yes
  - No
  - Unclear
5. In your opinion, the tiered diagnosis and treatment refers to:
- Transfer treatment from primary medical institutions, second-level hospitals and tertiary hospitals to superior hospitals
  - Disease treatment is graded by its seriousness, urgency and treatment difficulty. Medical institutions at different levels undertake the treatment of specific diseases to realize treatment from primary medical institutions and two-way transfer to appropriate medical institutions
  - Others (Please specify)
6. Do you believe it necessary to implement the tiered diagnosis and treatment?
- Yes
  - No (Please answer Question 8)
7. Reasons for developing such approach: (for multiple options) :
- To promote the formation of a sound health care structure
  - To ameliorate the medical burden of patients
  - To reduce work load of big hospitals
  - Others (Please specify)
8. Reasons for not developing such approach (for multiple options) :
- Primary medical institutions still need to improve their treatment, which is unfavorable for continuous therapy
  - The public has long accepted the non-tiered diagnosis and treatment system
  - It will limit the treatment autonomy of patients to a great extent
  - There is no effective interest distribution mechanism between primary medical institutions and those of second-level and tertiary hospitals
  - Others (Please specify)
9. How do you feel about the general implementation of the tiered diagnosis and treatment
- Very satisfied
  - Satisfied
  - Acceptable but not satisfied
  - Dissatisfied
  - Very dissatisfied due to more conflicts
10. What supporting facilities or measures should be added if the tiered diagnosis and treatment is to be implemented (multiple options) :

- To define standards and systems of transfer treatment
  - To define scope of practice for medical institutions in different levels
  - To improve medical practice of primary medical institutions
  - To emphasize the training of grassroots medical staff
  - To facilitate the equipment of primary medical institutions
  - To improve differentiated payment system of medical insurance
  - To advance publicity for guiding better medical treatment
  - To clarify the risk sharing mechanism
  - Others (Please specify)
- 11.What do you think of the role of private capital in the tiered diagnosis and treatment:
- Very low participation    ○Low participation    ○Limited participation
  - High participation        ○Very high participation
- 12.What is you view on their participation in primary medical treatment?
- Promising
  - Probably potential market opportunities but unable of fulfilling the public needs  
(Please answer Question 14)
  - Difficult (Please answer Question 14)
  - Unknown
- 13.Why do you think it is promising for private capital to invest in the primary medical treatment?  
(multiple options)
- Abundant financial resources
  - Attractive to doctors with high salary
  - Strong brand and marketing capabilities
  - Good facilities and technologies
  - Others (Please specify) \_\_\_\_\_
- 14.Why do you think it is difficult for private capital to develop in the primary medical treatment market? (multiple options)
- Hard to attract skillful doctors
  - Demand policy support
  - Too expensive for the general public
  - Others (Please specify) \_\_\_\_\_

III . Please share your expectation on tiered diagnosis and treatment.	Don't care↔Very concerned				
1.Asset-liability ratio of hospitals	1	2	3	4	5
2.Net asset growth rate of hospitals	1	2	3	4	5

3.Business expense and revenues of hospitals	1	2	3	4	5
4.Proportion of drugs and expensive consumables in the total revenues	1	2	3	4	5
5.Social and patient's satisfaction	1	2	3	4	5
6.Strict implementation of the charge policy on medical services	1	2	3	4	5
7.Patients' rights and interests such as the right to know	1	2	3	4	5
8.Proper treatment and prescription	1	2	3	4	5
9.Necessary working facilities provided by the primary medical institutions	1	2	3	4	5
10.Highly efficient, convenient and affordable basic health care and humanistic care for the public	1	2	3	4	5
11.Improved medical ethics and morality construction and performance evaluation system	1	2	3	4	5
12.Fair competition and reciprocal cooperation between hospitals	1	2	3	4	5
13.Observance and implementation of medical quality and safety systems	1	2	3	4	5
14.Observance of the performance evaluation and management system of comprehensive goals	1	2	3	4	5
15.Observance of access management standards for medical equipment	1	2	3	4	5
16.Review and inspection by health administration department	1	2	3	4	5
17.Medical staff shall have the qualification for practice	1	2	3	4	5
18.Implementation of related policies on price management, use of essential medicines and clinical pathway management	1	2	3	4	5
19.Completion of tasks commanded by the government such as regional emergencies and medical assistance	1	2	3	4	5
20.Active participation in community health education and disease prevention and publicity	1	2	3	4	5
21.Highly efficient two-way transfer pathway	1	2	3	4	5
22.Strict diagnosis at primary medical institutions to facilitate the formation of tiered diagnosis and treatment	1	2	3	4	5
23.Lower cost, waste avoidance and efficiency improvement	1	2	3	4	5
24.Proper disposal of wastes	1	2	3	4	5
25.Amelioration of the medical burden on patients	1	2	3	4	5
26.Convenient medical treatment	1	2	3	4	5

27.Improvement of medical treatment at primary hospitals to ameliorate the work load of big hospitals	1	2	3	4	5
28.Improvement in resource utilization of primary medical institutions	1	2	3	4	5
29.Improvement in allocation of medical resources	1	2	3	4	5
30.Improvement in management system of medical insurance information	1	2	3	4	5
31.Strict implementation of charging standards	1	2	3	4	5
32.Establishment of proper medical insurance policy on medical treatment combination	1	2	3	4	5
33.Rational examination and treatment according to the patient's disease	1	2	3	4	5
34.Sufficient supply of medicine in the medical insurance catalogue	1	2	3	4	5
35.Rational prescription of medicine beyond the medical insurance catalogue	1	2	3	4	5
If you have other concerns, please specify herein:					
IV. Please propose your suggestions about the implementation of tiered diagnosis and treatment system.					

Source: Zeng (2016); Chen (2017)

## Appendix 4: Questionnaire for staff at superior medical institutions

Dear Sir/Madam,

With gradual national promotion and public attention on tiered diagnosis and treatment system, concerns have also been raised together with the aspiration of such a medical reform. To investigate more about tiered diagnosis and treatment system, we would like to learn from you about your thoughts for the purpose of healthy and steady enhancement of this system. This questionnaire will be executed anonymously without keeping any of your personal information. All the related information is only for research purpose, to which only the research staff can have access.

Please tick your options with “√”. In Group III, if you desire that the tiered diagnosis and treatment could fulfil one particular demand, then choose 5; in case of general concern, please choose 3; in case of absolute no concern, please choose 1.

<p>I. Personal Information (tick your options with “√”)</p> <p>1. Gender : <input type="radio"/> Male <input type="radio"/> Female</p> <p>2. Age: _____</p> <p>3. Education background : <input type="radio"/> Doctor Degree <input type="radio"/> Master Degree  <input type="radio"/> Bachelor Degree <input type="radio"/> College Degree or below</p> <p>4. Position: <input type="radio"/> general practitioner <input type="radio"/> specialist <input type="radio"/> nurse <input type="radio"/> technician  <input type="radio"/> pharmacist <input type="radio"/> administrator</p> <p>5. Working experience:  <input type="radio"/> Less than 5 years <input type="radio"/> 5-10 years <input type="radio"/> 11-15 years <input type="radio"/> 16-20 years <input type="radio"/> More than 20 years</p> <p>6. Professional title: <input type="radio"/> None <input type="radio"/> Junior professional title <input type="radio"/> Intermediate professional title  <input type="radio"/> Senior professional title</p>
<p>II. Cognition and Recognition of Tiered Diagnosis and Treatment</p> <p>1. Are you familiar with tiered diagnosis and treatment system:  <input type="radio"/> Extremely familiar <input type="radio"/> Very familiar <input type="radio"/> Familiar <input type="radio"/> Not very familiar <input type="radio"/> Not at all</p> <p>2. How did you get to know the tiered diagnosis and treatment system:  <input type="radio"/> Training of health administrative department  <input type="radio"/> Company training  <input type="radio"/> Traditional media such as CCTV news and newspapers  <input type="radio"/> Mobile We-media such as Microblog and WeChat official accounts  <input type="radio"/> Family members, friends and colleagues  <input type="radio"/> Other sources (Please specify)</p>

3. Have your medical institution already launched the implementation measures of the tiered diagnosis and treatment yet:

- Yes    No    Unclear

4. Have your medical institution offered trainings related to the tiered diagnosis and treatment:

- Yes    No    Unclear

5. In your opinion, the tiered diagnosis and treatment refers to:

Transfer treatment from primary medical institutions, second-level hospitals and tertiary hospitals to superior hospitals

Disease treatment is graded by its seriousness, urgency and treatment difficulty. Medical institutions at different levels undertake the treatment of specific diseases to realize treatment from primary medical institutions and two-way transfer to appropriate medical institutions

Others (Please specify)

6. Is there any transfer indicator passed to your department by your medical institution?

- Yes    No    Unclear

7. Has your department ever received any patient transferred from primary medical institutions?

- Yes    No

8. In your opinion, how many of outpatients can be usually treated at primary medical institutions?

- Less than 30%    31%-50%    51%-80%    More than 80%

9. How many patients transferred from primary medical institutions have you received in the past two months?

- 0    Less than 10    11-20    21-30    31-40    41-50    More than 50

10. What types of patients have you received (multiple choices)?

patients suffering from common and frequently-occurring disease

patients suffering from complex diseases

patients suffering from serious diseases

patients in need of special examinations unavailable at primary medical institutions

requirement of patients and their dependents

11. Would you transfer inpatients in need of rehabilitation to primary medical institutions?

- Yes    No (please directly answer Question 13)

12. Please specify the reasons for transferring your patients to primary medical institutions (multiple choices):

to increase patient bed turnover efficiency

to ameliorate medical burdens on patients

to provide convenience to the patients

to follow policy and regulation

others (\_\_\_\_\_)



13. Please specify the reasons for not transferring your patients to primary medical institutions (multiple choices):

- lack of standards and regulations on such transfer
- medical treatment to be improved at primary medical institutions, which may affect continuous high-quality treatment for the patients
- unwillingness of transferring the patients to primary medical institutions due to declined business income
- patients' behaviour of medical treatment and unwillingness of transfer;  Others (please specify \_\_\_\_\_)

14. Have you gone through procedures for patients in the past two months?

- Yes
- No (please directly answer Question 19)

15. If yes, what do you think about the procedures?

- too complicated
- not too troublesome
- very efficient and convenient

16. Whether is there any patient under your treatment who has been engaged in any conflict because of transfer procedures in the past two months?

- Yes
- No

17. Are you satisfied with the transfer process?

- Very satisfied
- Satisfied
- Acceptable but not satisfied (please answer Question 18)
- Dissatisfied (please answer Question 18)
- Very dissatisfied due to more conflicts (please answer Question 18)

18. During the transfer process, which parts do you find unsatisfying/extremely unsatisfying (multiple choices)?

- difficulty in communicating with patients due to low recognition of the transfer process
- lack of personnel in full charge of transfer at the hospital and complex operation process
- incapability of the primary medical institutions in receiving, continuously treating and tracking the referred patients
- difficulty in practice because of indefinite standards and regulations on patient transfer.

19. Do you find it necessary to carry out tiered diagnosis and treatment?

- Yes
- No (if applies, please answer question 21)

20. Please specify the reasons if you find it necessary to carry out tiered diagnosis and treatment (multiple choices):

- it can stimulate the formation of reasonable medical treatment
- it can ameliorate the patients' medical burdens for the convenience of the patients
- it can relieve stress of superior hospitals
- it can maximize efficient and effective usage of medical resources

others (please specify)

21. Please specify the reasons if you find it unnecessary to carry out tiered diagnosis and treatment (multiple choices):

the primary medical institutions have to improve their professional skills, which are not favourable to the patients' continuous medical treatment

the public has formed a long-term concept of receiving medical treatment and won't easily accept tiered diagnosis and treatment

it has seriously restricted the choices made by the patients

there has been no proper and effective profit distribution mechanism between second-level and tertiary hospitals and primary medical institutions

others (please specify) \_\_\_\_\_

22. What do you think about the tiered diagnosis and treatment generally?

extremely satisfied

not so satisfied

unsatisfied, but acceptable

extremely unsatisfied due to the increase of medical conflicts

23. In your opinion, what might impede the progress of tiered diagnosis and treatment? (multiple choices)

lack of talents for medical treatment as a whole

lack of talents for primary medical treatment

incapability of primary medical care institutions

poor hardware infrastructure of primary care institutions

low trust in primary care by patients

insufficient policy support

small gap in costs between treatment in primary medical institutions and superior hospitals

insufficient publicity by the government

no such obstruction

others (please specify)

24. In your opinion, what are required to realize the tiered diagnosis and treatment (multiple choices)?

definite standards and policies for patient transfer

definite business scope of medical institutions of different levels

enhancement of professional skills of primary medical institutions

emphasis on talent development for primary medical treatment

improvement of differentiated payment policy for medical insurance

enhancement of publicity to guide the public in medical treatment

others (please specify)

25. In which ways do you think the internet medical treatment could contribute to tiered diagnosis and treatment (multiple choices)? <input type="radio"/> remote medical care <input type="radio"/> care of chronic diseases <input type="radio"/> registration reservation <input type="radio"/> others (please specify)					
III .Please share your expectation on tiered diagnosis and treatment.	Don't care↔Very concerned				
1. To increase my income.	1	2	3	4	5
2. To help me build connection with more patients.	1	2	3	4	5
3. To enable faster promotion by providing instructions at primary medical institutions.	1	2	3	4	5
4. My performance at primary medical institutions can be taken into consideration during my performance review at the hospital.	1	2	3	4	5
5. My medical and management techniques can be adopted and applied to primary medical institutions.	1	2	3	4	5
6. To gain social recognition and improve social influence through work guidance at primary medical institutions.	1	2	3	4	5
7. To be recognized by the leaders and colleagues, share my workload by providing instructions at member hospitals of the medical treatment combination.	1	2	3	4	5
8. The primary medical institutions can provide me with the necessities for life.	1	2	3	4	5
9. The primary medical institutions can provide me with the necessities for work.	1	2	3	4	5
10. The primary medical institutions can provide me with sound benefits on safety, compensation for medical dispute and travel insurance, etc.	1	2	3	4	5
11. The primary medical institutions can provide me with a good assisting team who will support and respect me.	1	2	3	4	5
12. To ask for my suggestions when it's about my personal interest at primary medical institutions.	1	2	3	4	5
13. To win reputation and recognition by the government and the public for the hospital I'm working for.	1	2	3	4	5
14. To relieve stress at my work.	1	2	3	4	5
15. To win bigger market share for the hospital via the promotion of tiered diagnosis and treatment system and the	1	2	3	4	5

establishment of medical treatment combination.					
16.To increase the hospital's income in the course of promoting the tiered diagnosis and treatment system and establishing the medical treatment combination.	1	2	3	4	5
17.To receive more patients transferred from the primary medical institutions through the promotion of tiered diagnosis and treatment system and establishment of medical treatment combination.	1	2	3	4	5
18.The primary medical institutions can accept patients transferred by our hospital to relieve the stress of hospitalization via the promotion of tiered diagnosis and treatment system and the establishment of medical treatment combination.	1	2	3	4	5
19.To relieve the outpatient stress of our hospital in the course of promoting tiered diagnosis and treatment system.	1	2	3	4	5
20. The government's medical insurance department is expected to increase the reimbursement proportion of tiered diagnosis and treatment, guide patients to receive medical treatment at our hospital.	1	2	3	4	5
21. The administrative department is expected to grant me more freedom of practice.	1	2	3	4	5
22. To intensify the medical competency of primary medical institutions.	1	2	3	4	5
23.To increase the income of primary medical institutions.	1	2	3	4	5
24.To standardize the management of primary medical institutions.	1	2	3	4	5
25. To ameliorate medical burdens on the patients.	1	2	3	4	5
26.To bring about more convenience to the patients for medical treatment.	1	2	3	4	5
If you have other expectations, please specify here:					
IV、 Please share your suggestions on the execution of tiered diagnosis and treatment.					

Source: Source: Zeng (2016); Chen (2017)

## Appendix 5: Questionnaire for staff at primary medical institutions

Dear Sir/Madam,

With gradual national promotion and public attention on tiered diagnosis and treatment system, concerns have also been raised together with the aspiration of such a medical reform. To investigate more about tiered diagnosis and treatment system, we would like to learn from you about your thoughts for the purpose of healthy and steady enhancement of this system. This questionnaire will be executed anonymously without keeping any of your personal information. All the related information is only for research purpose, to which only the research staff can have access.

Please tick your options with “√”. In Group III, if desire that the tiered diagnosis and treatment could fulfil one particular demand, then choose 5; in case of general concern, please choose 3; in case of absolute no concern, please choose 1.

<p>I. Personal Information (tick your options with “√”)</p> <p>1. Gender: <input type="radio"/> Male <input type="radio"/> Female</p> <p>2. Age: _____</p> <p>3. Education background: <input type="radio"/> Doctor Degree <input type="radio"/> Master Degree  <input type="radio"/> Bachelor Degree <input type="radio"/> College Degree or below</p> <p>4. Position: <input type="radio"/> general practitioner <input type="radio"/> specialist <input type="radio"/> nurse  <input type="radio"/> technician <input type="radio"/> pharmacist <input type="radio"/> administrator</p> <p>5. Working experience:  <input type="radio"/> Less than 5 years <input type="radio"/> 5-10 years <input type="radio"/> 11-15 years <input type="radio"/> 16-20 years <input type="radio"/> More than 20 years</p> <p>6. Professional title:  <input type="radio"/> None <input type="radio"/> Junior professional title <input type="radio"/> Intermediate professional title <input type="radio"/> Senior professional title</p>
<p>II. Cognition and Recognition of Tiered Diagnosis and Treatment</p> <p>1. Are you familiar with tiered diagnosis and treatment system:  <input type="radio"/> Extremely familiar <input type="radio"/> Very familiar <input type="radio"/> Familiar <input type="radio"/> Not very familiar <input type="radio"/> Not at all</p> <p>2. How did you get to know the tiered diagnosis and treatment system:  <input type="radio"/> Training of health administrative department  <input type="radio"/> Company training  <input type="radio"/> Traditional media such as CCTV news and newspapers  <input type="radio"/> Mobile We-media such as Microblog and WeChat official accounts  <input type="radio"/> Family members, friends and colleagues  <input type="radio"/> Other sources (Please specify)</p>

3. Have your medical institution already launched the implementation measures of the tiered diagnosis and treatment yet:  Yes  No  Unclear
4. Have your medical institution offered trainings related to the tiered diagnosis and treatment:  
 Yes  No  Unclear
5. In your opinion, the tiered diagnosis and treatment refers to:
- Transfer treatment from primary medical institutions, second-level hospitals and tertiary hospitals to superior hospitals
  - Disease treatment is graded by its seriousness, urgency and treatment difficulty. Medical institutions at different levels undertake the treatment of specific diseases to realize treatment from primary medical institutions and two-way transfer to appropriate medical institutions
  - Others (Please specify)
6. Is there any transfer indicator passed to your department by your medical institution? \
- Yes  No  Unclear
7. How many patients under your treatment can usually be treated at primary medical institutions?
- Less than 30%  31%-50%  51%-80%  More than 80%
8. What do you think about the influences brought about by providing patients with initial treatment at primary medical institutions (multiple choices)?
- To enhance professional skills of staff working at primary medical institutions
  - To increase the income of staff working at primary medical institutions
  - To benefit the patients for receiving prompt and continuous medical treatment
  - To benefit the society to more concern the development of primary medical treatment
  - Others (please specify)
9. In your opinion, what makes your medical institution incapable of fulfilling the requirements of patient transfer (multiple choices)?
- Lack of medical staff, lack of professional skills
  - Obsolete medical equipment
  - Lack of specific standards and procedures for patient transfer
  - Insufficient policy on medical insurance to encourage the public to come for treatment
  - No authority of forcing the patients to be transferred to the primary medical institutions
  - Others (please specify)
10. Have you received patients transferred from superior medical institutions in the past two months?
- Yes  No (please directly answer Question 13)
11. How many patients transferred from superior medical institutions have you received/managed in the past two months?
- 0  Less than 10  11-20  21-30  31-40  41-50  More than 50
12. What types of patients have you received/managed?

- patients suffering from common and frequently-occurring disease with definite diagnostic result and treatment plan
  - patients in the stage of rehabilitation or recovery
  - transfer downwards as requested by the patient/dependent
  - palliative care
  - others (please specify)
13. Have you ever handled patient transfer in the past two months?
- Yes
  - No (please directly answer Question 17)
14. The mostly common reasons for patient transfer to superior hospitals include (multiple choices):
- the medical devices cannot meet the patients' need for treatment
  - the medicine cannot meet the patients' need for treatment
  - the patients and their dependents strongly request transfer
  - the patients' diseases are beyond the treatment scope of primary medical institutions
  - the patients are unwilling to take any potential risks
  - others (please specify)
15. If yes, what do you think about the procedures?
- too complicated
  - not too troublesome
  - very efficient and convenient
16. Whether is there any patient under your treatment who has been engaged in any conflict because of transfer procedures in the past three months?
- Yes
  - No
17. Do you find it necessary to carry out tiered diagnosis and treatment?
- Yes
  - No (please answer Question 19)
18. Please specify the reasons if you find it necessary to carry out tiered diagnosis and treatment (multiple choices):
- it can stimulate the formation of reasonable medical treatment
  - it can reduce the patients' medical burden for the convenience of the patients
  - it can reduce the stress of superior hospitals
  - others (please specify \_\_\_\_\_)
19. Please specify the reasons if you find it unnecessary to carry out tiered diagnosis and treatment (multiple choices):
- the primary medical institutions have to improve their professional skills, which are not favourable to the patients' continuous medical treatment
  - the public has formed a long-term concept of receiving medical treatment and won't easily accept tiered diagnosis and treatment

<ul style="list-style-type: none"> <li>○ it has seriously restricted the choices made by the patients</li> <li>○ there has been no proper and effective profit distribution mechanism between second-level and tertiary hospitals and primary medical institutions</li> <li>○ others (please specify) _____</li> </ul> <p>20. How do you evaluate the general implementation of the tiered diagnosis and treatment?</p> <ul style="list-style-type: none"> <li>○ Very satisfied   ○ Satisfied   ○ Acceptable but not satisfied   ○ Dissatisfied</li> <li>○ Very dissatisfied due to more conflicts</li> </ul> <p>21. In your opinion, which supporting conditions or measures are still required to realize the tiered diagnosis and treatment (multiple choices)?</p> <ul style="list-style-type: none"> <li>○ definite standards and policies for patient transfer</li> <li>○ definite business scope of medical institutions at different levels</li> <li>○ enhancement of professional skills at primary medical institutions</li> <li>○ emphasis on talent development for primary medical treatment</li> <li>○ intensification of equipment construction at primary medical institutions</li> <li>○ perfection of differentiated payment system for medical insurance</li> <li>○ intensification of publicity to guide the public in medical treatment</li> <li>○ definite risk-sharing mechanism</li> <li>○ others (please specify)</li> </ul>					
III .Please share your expectation on tiered diagnosis and treatment.			Don't care ↔ Very concerned		
1. To gain reasonable salary commensurate with my contribution to increase my income.	1	2	3	4	5
2. To have better welfare.	1	2	3	4	5
3. To have nice environment for diagnosis, treatment and work	1	2	3	4	5
4. To receive sound safety guarantee.	1	2	3	4	5
5. Reasonable working time	1	2	3	4	5
6. To comparatively relieve the pressure at work.	1	2	3	4	5
7. To get concerns and support from the leaders.	1	2	3	4	5
8. To get support and respect while cooperating with staff working at superior medical institutions.	1	2	3	4	5
9. To get instructions and assistance from experts of the hospital.	1	2	3	4	5
10. To get opportunity of training and further education to improve my professional skills.	1	2	3	4	5
11. To have reasonable and proper mechanism for professional promotion.	1	2	3	4	5



12. To take into consideration of the employees' suggestions for decision-making on important affairs.	1	2	3	4	5
13. To acquire comments of the medical staff working at primary medical institutions when their interests are involved in decision-making.	1	2	3	4	5
14. To increase the proportion of reimbursement in tiered diagnosis and treatment and guide patients to receive medical treatment at primary medical institutions.	1	2	3	4	5
15. To increase the utilization of resources at primary care institutions.	1	2	3	4	5
16. To expect the competent administration department to further grant me more freedom of practice.	1	2	3	4	5
17. To intensify the capacity for diagnosis and treatment of primary medical institutions	1	2	3	4	5
18. To increase the income of primary medical institutions.	1	2	3	4	5
19. To standardize the management of primary medical institutions	1	2	3	4	5
20. To ameliorate medical burdens on the patients.	1	2	3	4	5
21. To be more convenient for patients to receive medical treatment.	1	2	3	4	5
If you have other expectations, please specify here:					
IV. Please share your suggestions on the execution of tiered diagnosis and treatment.					

Source: Zeng (2016); Chen (2017)

## Appendix 6 Questionnaire for the public

Dear Sir/Madam,

With gradual national promotion and public attention on tiered diagnosis and treatment system, concerns have also been raised together with the aspiration of such a medical reform. To investigate more about tiered diagnosis and treatment system, we would like to learn from you about your thoughts for the purpose of healthy and steady enhancement of this system. This questionnaire will be executed anonymously without keeping any of your personal information. All the related information is only for research purpose, to which only the research staff can have access.

Please tick your options with “√”. In Group III, if you desire that the tiered diagnosis and treatment could fulfil one particular demand, then choose 5 in case of general concern, please choose 3 in case of absolute no concern, please choose 1.

I. Personal Information (tick your options with “√”)

1. Gender: Male Female

2. Age: \_\_\_\_\_

3. Education background:

secondary middle school or below senior high school

junior college or senior college Bachelor Degree above Bachelor Degree

4. Job category:

administrative department public institution enterprise self-employed employer

farmer student retired personnel soldier others

5. Monthly income of your family:

below RMB 2,000 RMB 2,000-5,000 RMB 5,001-8,000

RMB 8,001-10,000 Above RMB 10,000

6. Type of your medical insurance:

new rural cooperative medical insurance

medical insurance for urban employees

medical insurance for urban citizens

completely free medical treatment

commercial medical insurance

self-supporting

7. The nearest medical institution in your region is:

Health clinic in town or community health centre

<p>○ County level hospital or district level hospital</p> <p>○ Provincial/municipal level-3 hospital</p> <p>8. You select hospital based on the following criteria when you're sick:</p> <p>○ state of an illness    ○ expenses    ○ distance    ○ service attitudes</p> <p>○ capacity for medical treatment    ○ medical equipment</p> <p>○ proportion of reimbursement by medical insurance</p> <p>○ varieties of medicine    ○ sound sanitary environment.</p> <p>9. When you or your family member gets sick, your fist choice of the medical institution would be:</p> <p>○ health clinic in town or community health centre</p> <p>○ comprehensive large hospital (including county/district level hospital, provincial/municipal tertiary hospital)</p> <p>○ private clinic</p> <p>○ to purchase drugs at a retail pharmacy</p>
<p>II . Cognition and Recognition of Tiered Diagnosis and Treatment</p> <p>1. Are you familiar with the tiered diagnosis and treatment system?</p> <p>○ Extremely familiar    ○ very familiar    ○ familiar    ○ not very familiar    ○ not at all</p> <p>2. How did you get to know the tiered diagnosis and treatment system?</p> <p>○ from the hospital personnel or health technicians</p> <p>○ from primary medical institution personnel or health technical personnel</p> <p>○ community publicity</p> <p>○ traditional media such as CCTV news and newspapers, etc.</p> <p>○ We-media such as Microblog and WeChat public accounts, etc.</p> <p>○ recommendations by family members, friends and colleagues</p> <p>○ others (please specify)</p> <p>3. In your opinions, the tiered diagnosis and treatment refer to: ○ the patient transfer upwards following the order of primary medical institutions, second-level and tertiary hospitals</p> <p>○ the medical treatment classified by the seriousness and urgency of illness, the difficulty in treatment the medical institutions at different levels will treat different diseases to realize initial treatment by primary medical institutions and two-way patient transfer</p> <p>○ Others (please specify)</p> <p>4. Have you heard about initial treatment by primary medical institutions?</p> <p>○ Yes    ○ No</p> <p>5. How many times have you received medical treatment in the health clinic in town/ community health centre in the past six months?</p> <p>○ 0    ○ 1-2 times    ○ 3-4 times    ○ 5 times and above</p> <p>6. How many times have you received medical treatment in comprehensive large hospitals (including</p>

county/district level hospitals, provincial/municipal level-3 hospitals) in the past six months?

0    1-2 times    3-4 times    5 times and above

7. How long does it take for you to walk to the nearest health clinic in town or community health centre?

within 5 minutes    5-15 minutes    15-30 minutes    more than 30 minutes    unclear

8. Would you prefer the health clinic in town or community health centre when you are sick?

Yes    No (please directly answer Question 10)

it depends on the seriousness of illness (please answer both Questions 9 and 10)

9. The reasons why you prefer health clinic in town or community health centre firstly include (multiple choices):

low cost for medical treatment    short distance from home, which makes it more convenient

common and frequently-occurring diseases    good service attitudes of the medical staff

the doctors are more familiar with my health condition    I trust the doctors' professional skills

I can access relevant information of disease prevention and healthcare

it's a designated medical insurance institution with high proportion of reimbursement

it's just a personal habit    it's required by the policy

it's just for the purpose for prescription and getting the medicine

others (please specify)

10. The reasons why you are unwilling to go to the health clinic in town or community health centre firstly might be (multiple choices):

incompetency of the doctors    incomplete medical equipment for patient examination

poor treatment environment    serious state of illness

insufficient medicines at primary care institutions    just personal habit

very small cost gap among different levels of medical institutions

others (please specify)

11. Do you know the two-way transfer service between superior hospitals and health clinic in town/community health centre?

Yes    No (please directly answer Question 13)

12. How did you know about the two-way transfer service (multiple choices)?

from hospital or its medical personnel

from primary medical institutions or its medical personnel

from the community publicity

from traditional media such as CCTV news and newsletter, etc.

via We-media such as Microblog and WeChat public accounts

via recommendations by family members, friends and colleagues

others (please specify)

13. Have you ever experienced transfer before?

- Yes    No (please directly answer Question 17)

14. The transfer you have experienced followed:

- oral recommendation by the doctor    through relevant transfers procedure  
 me or my family members' requirement

15. During the course of transfer, which do you find unsatisfying (multiple choices)?

- I cannot choose the hospital to transfer to except those within the medical treatment combination  
 unaware of the transfer flow and standards    no cost discount  
 too complicated transfer procedures    extra cost for transfer    repeated examinations  
 long time waiting for treatment after transfer without green channel service  
 others (please specify)

16. In your opinions, what can you benefit from the transfer?

- efficient procedures for medical treatment with reduced waiting time  
 timely and continuous treatment of the disease  
 increased proportion of medical insurance reimbursement to save medical costs  
 no need for repeated examinations    no benefit    unclear  
 others (please specify)

17. What do you think about the policy that “the proportion of medical insurance reimbursement shall be increased for transferred patients”?

- extremely agree    agree    disagree    extremely disagree    I don't care.

18. Do you find whether it is necessary to carry out tiered diagnosis and treatment?

- Yes    No (please answer Question 20)

19. Please specify the reasons why you find it necessary to carry out tiered diagnosis and treatment (multiple choices):

- it can stimulate the formation of reasonable medical treatment  
 it can reduce patients' medical burden and become more convenient for them  
 it can reduce a lot of stress of large hospitals  
 others (please specify)

20. Please specify the reasons why you find it unnecessary to carry out tiered diagnosis and treatment (multiple choices):

- the current incompetency of primary medical institutions is uncondusive to carry out continuous treatment for the patients  
 the public has formed a long-term concept of receiving medical care and won't easily welcome tiered diagnosis and treatment  
 it will seriously restrict choices by patients  
 there hasn't been an effective benefit distribution mechanism between primary medical institutions

and second-level and tertiary hospitals ○ others (please specify) 21. How do you think about the tiered diagnosis and treatment generally? ○Very satisfied   ○ Satisfied   ○Acceptable but not satisfied   ○ Dissatisfied ○Very dissatisfied due to more conflicts					
III. Please share your expectation on tiered diagnosis and treatment.	Don't care↔Very concerned				
1. To avoid unreasonable charges	1	2	3	4	5
2. To reduce the cost for medical treatment	1	2	3	4	5
3. To choose supportable treatment plan according to patients' exact sickness	1	2	3	4	5
4. To increase the proportion of reimbursement in a step-by-step manner, enjoy more preferential medical insurance for initial treatment at town/community health centre, e.g.: to increase the proportion of reimbursement for initial treatment at town/community health centre.	1	2	3	4	5
5. To reduce the waiting time for outpatient services at superior hospitals	1	2	3	4	5
6. To reduce the waiting time for hospitalization at superior hospitals	1	2	3	4	5
7. To seek medical treatment in a more convenient and highly efficient manner.	1	2	3	4	5
8. To enable medical experts from superior hospitals to practice at lower level hospitals on a regular basis.	1	2	3	4	5
9. To set up highly efficient patient transfer channel between hospitals within medical treatment combination.	1	2	3	4	5
10. To recognize the diagnosis results mutually among hospitals within medical treatment combination for the purpose of reducing unnecessary repeated examinations.	1	2	3	4	5
11. To get access to medical treatment in time at nearby medical institutions.	1	2	3	4	5
12. To increase primary medical institutions.	1	2	3	4	5
13. To highlight high level expertise and technical skills at primary medical institutions.	1	2	3	4	5
14. To feature sound medical environment at primary medical institutions.	1	2	3	4	5

15. Not to do examinations at superior hospitals as primary medical institutions have been equipped with advanced medical equipment.	1	2	3	4	5
16. The medical services provided by all medical institutions shall comply with standards for diagnosis and treatment.	1	2	3	4	5
17. To increase the resource utilization of primary medical institutions	1	2	3	4	5
18. To guarantee the safety of medical services	1	2	3	4	5
19. Patients can select medical care staff within the medical treatment combination at their discretion.	1	2	3	4	5
20. To treat every patient equally.	1	2	3	4	5
21. To manage the primary medical institutions in a standard manner.	1	2	3	4	5
22. To reduce the patient's burdens by eliminating unnecessary examinations and prescription.	1	2	3	4	5
23. The medical personnel shall listen to the patients patiently to better know the state of illness.	1	2	3	4	5
24. The medical personnel are obliged to protect the patients' privacy.	1	2	3	4	5
25. To explain to patients the purpose of specific examinations and treatment in advance	1	2	3	4	5
26. To acquire the patient's approval before implementing the treatment plan	1	2	3	4	5
27. To deal with complaints and suggestions proposed by patients and their families properly	1	2	3	4	5
28. To publicize the hospitals' charging items and information	1	2	3	4	5
29. To provide the payment list and the cost inquiry service on the daily basis.	1	2	3	4	5
30. To provide multiple channels to receive complaints from patients and their family members (telephone line, mailbox, etc.)	1	2	3	4	5
31. To establish the family doctor system	1	2	3	4	5
32. To provide the on-site medical service	1	2	3	4	5
33. To carry out health education to the public on a regular	1	2	3	4	5

basis					
If there are other claims, please specify here:					
IV. Please share your suggestions on the execution of tiered diagnosis and treatment.					

Source: Zeng (2016); Chen (2017)



## Appendix 7: Questionnaire for enterprise personnel

Dear Sir/Madam,

With gradual national promotion and public attention on tiered diagnosis and treatment system, concerns have also been raised together with the aspiration of such a medical reform. To investigate more about tiered diagnosis and treatment system, we would like to learn from you about your thoughts for the purpose of healthy and steady enhancement of this system. This questionnaire will be executed anonymously without keeping any of your personal information. All the related information is only for research purpose, to which only the research staff can have access.

Please tick your options with “√”. In Group III, if you desire that the tiered diagnosis and treatment could fulfil one particular demand, then choose 5 in case of general concern, please choose 3 in case of absolute no concern, please choose 1.

<p>I . Personal information (please tick)</p> <p>1. Gender: <input type="radio"/>Male <input type="radio"/>Female</p> <p>2. Age: _____</p> <p>3. Education background: <input type="radio"/>Doctor Degree <input type="radio"/>Master Degree  <input type="radio"/>Bachelor Degree <input type="radio"/>College degree and below</p> <p>4. Do you have a job?  <input type="radio"/>No <input type="radio"/>Yes (please specify) _____</p> <p>5. Work experience:  <input type="radio"/>Less than 5 years <input type="radio"/>5-10 years <input type="radio"/>11-15 years <input type="radio"/>16-20 years <input type="radio"/>More than 20 years</p> <p>6. Professional title:  <input type="radio"/>None <input type="radio"/>Junior <input type="radio"/>Intermediate <input type="radio"/>Senior</p>
<p>II . Cognition and Recognition of Tiered Diagnosis and Treatment</p> <p>1. Are you familiar with tiered diagnosis and treatment system?  <input type="radio"/>Very familiar <input type="radio"/>Familiar <input type="radio"/>Not familiar <input type="radio"/>I know nothing about it</p> <p>2. How did you know about the tiered diagnosis and treatment system?  <input type="radio"/>trainings by superior authorities <input type="radio"/>on-job training  <input type="radio"/>traditional media such as CCTV news and newspaper  <input type="radio"/>We-media such as Blog and WeChat public accounts  <input type="radio"/>recommendations by family, friends and colleagues  <input type="radio"/>others (please specify)</p> <p>3. Is there any training done on tiered diagnosis and treatment at your institution?</p>

Yes    No    unknown

4. In your opinions, the tiered diagnosis and treatment refers to:

- transfer in the order from primary medical institution to second-level and tertiary hospitals
- medical treatment prioritized by the seriousness of illness, difficulty in treatment and medical institutions at different levels for specific treatment to realize initial treatment by primary institutions and two-way transfer
- others (please specify)

5. Do you find whether it is necessary to carry out tiered diagnosis and treatment?

Yes    No (please answer Question 8).

6. Please specify the reasons why you find it necessary to carry out tiered diagnosis and treatment (multiple choices):

- it can stimulate the formation of reasonable medical treatment
- it can reduce patients' medical burden and become more convenient for them
- it can reduce a lot of stress of large hospitals
- others (please specify)

7. Please specify the reasons why you find it unnecessary to carry out tiered diagnosis and treatment (multiple choices):

- the current incompetency of primary medical institutions is uncondusive to carry out continuous treatment for the patients
- the public has formed a long-term concept of receiving medical care and won't easily welcome tiered diagnosis and treatment
- it will seriously restrict choices by patients
- there hasn't been an effective benefit distribution mechanism between primary medical institutions and second-level and tertiary hospitals
- others (please specify)

8. How do you think about the tiered diagnosis and treatment?

- Very satisfied    Satisfied    Acceptable but not satisfied    Dissatisfied
- Very dissatisfied due to more conflicts

9. In your opinion, what are required to realize tiered diagnosis and treatment (multiple choices)?

- Clear standards and policies for patient transference
- Definite business scope of medical institutions of different levels
- Professional skill enhancement of primary medical institutions
- Awareness of talent development for primary care
- Strengthening equipment construction of primary medical institutions
- Improving payment policy for medical insurance differentiation
- Increasing promotion to instruct the public

<p>○ Identified risk-sharing mechanism</p> <p>○ Others (please specify _____)</p> <p>10. How do you think about the level of participation of enterprises in the tiered diagnosis and treatment?</p> <p>○ Extremely low    ○ Quite low    ○ Fair    ○ Quite high    ○ Extremely high</p> <p>11. Which enterprises in your opinions mostly participate in tiered diagnosis and treatment?</p> <p>○ Medicine suppliers    ○ Suppliers of medical devices and medical materials    ○ No idea</p> <p>12. How do you think about the enterprises' influence on tiered diagnosis and treatment?</p> <p>○ Extremely little    ○ Little    ○ Fair    ○ Huge    ○ Extremely huge</p> <p>13. How do you think about the influence of tiered diagnosis and treatment on enterprises?</p> <p>○ Extremely little    ○ Little    ○ Fair    ○ Huge    ○ Extremely huge</p>					
III. Please share your expectation on tiered diagnosis and treatment.			Don't care ↔ Very concerned		
1. To increase personal income	1	2	3	4	5
2. To actively participate in tiered diagnosis and treatment, and get promotion opportunities.	1	2	3	4	5
3. To actively participate in tiered diagnosis and treatment, increase the enterprise's income	1	2	3	4	5
4. To actively participate in tiered diagnosis and treatment, to reduce the enterprise taxes	1	2	3	4	5
5. To actively participate in tiered diagnosis and treatment, get government funding on enterprises' research and development.	1	2	3	4	5
6. To expand the enterprise's product category	1	2	3	4	5
7. To increase the enterprise's sales volume	1	2	3	4	5
8. To enhance the enterprise's brand reputation	1	2	3	4	5
9. To increase the product's recognition by primary medical institutions	1	2	3	4	5
10. To increase the product's recognition by superior medical institutions	1	2	3	4	5
11. To expand the products' market share	1	2	3	4	5
12. To increase the enterprise's participation in tiered diagnosis and treatment	1	2	3	4	5
13. To increase the enterprises' influence on the execution of tiered diagnosis and treatment	1	2	3	4	5
14. To increase the medicine categories in <i>National Essential Drug List</i>	1	2	3	4	5

15. To increase the medicine categories of primary medical institutions	1	2	3	4	5
16. To expand the insurance coverage on medicine	1	2	3	4	5
If there are other expectations, please specify here:					
IV. Please share your suggestions on the execution of tiered diagnosis and treatment.					

Source: Zeng (2016); Chen (2017)

## Appendix 8: Member hospitals of Zhongda hospital southeast university group

Table: Member hospitals of Zhongda hospital southeast university group

Number	Member Hospitals
1	Siyang Hospital of Traditional Chinese Medicine
2	Gaoyou People's Hospital
3	Liyang Hospital of Traditional Chinese Medicine
4	Binhai People's Hospital
5	Nanjing Central Hospital
6	People's Hospital of Quanjiao
7	Lai' An People's Hospital
8	Tianchang Hospital of Traditional Chinese Medicine
9	Xiangshui People's Hospital
10	Lianshui People's Hospital
11	Xuyi People's Hospital
12	Jurong People's Hospital
13	Shuyang Hospital of Traditional Chinese Medicine
14	Lishui Branch of Zhongda Hospital Southeast University (Nanjing Lishui District People's Hospital)
15	Wuxi Branch of Zhongda Hospital Southeast University (Wuxi Xishan People's Hospital)
16	Xinghua People's Hospital
17	Changzhou Wujin People's Hospital
18	Jinhu People's Hospital
19	Lianyungang Municipal Oriental Hospital
20	Changzhou No. 7 People's Hospital
21	Danyang People's Hospital
22	Nanjing Pukou Hospital of Traditional Chinese Medicine
23	Mingguang Hospital of Traditional Chinese Medicine
24	Ma'anshan Shiqiye Hospital
25	Suqian Hospital of Traditional Chinese Medicine

26	Chuzhou Hospital of Traditional Chinese Medicine
27	Zhenjiang Hospital of Traditional Chinese Medicine
28	The First People's Hospital of Bengbu
29	the Third People's Hospital of Danyang
30	Yancheng Sixth People's Hospital
31	Nanjing Jinkang Medical Health Care Group
32	Nanjing Ruidong Hospital
33	Nanjing Ruihaibo Medical Rehabilitation Center
34	Dangtu People's Hospital
35	Wuhu No. 1 People's Hospital
36	Hexian People's Hospital
37	People's Hospital of Guannan
38	Jintan District People's Hospital
39	Drum Tower Hospital of Fengyang County
40	Funing People's Hospital
41	Chinese Medicine Hospital in Yangzhong City
42	Traditional Chinese Medicine Hospital of Kunshan
43	Guangde Hospital of Traditional Chinese Medicine
44	Chuzhou Hospital of Integrated Traditional Chinese and Western Medicine
45	Taizhou Hospital of Integrated Traditional Chinese and Western Medicine
46	Gaoyou Hospital of Traditional Chinese Medicine
47	Taizhou No. 2 People's Hospital
48	Huaining People's Hospital
49	The First People's Hospital of Anqing
50	Yancheng Dafeng Hospital of Traditional Chinese Medicine
51	Yizheng People's Hospital
52	Suqian Zhongwu Hospital
53	Dongtai Hospital of Traditional Chinese Medicine
54	Yancheng Third People's Hospital
55	12 community health service centers in Nanjing

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**Appendix 9: Results of Mitchell score-based approach, etc.**

Table 1: Results of Mitchell score-based approach (n=20)

Stakeholders	Authority			Legitimacy			Urgency			
	Weak	Normal	Strong	Weak	Normal	Strong	Weak	Normal	Strong	
The government	Health Administrative Department	0	0	20	1	1	18	1	1	18
	Medical Insurance Department	2	3	15	1	5	14	3	8	9
	Department of Finance	8	6	6	8	8	4	9	6	5
	Price Department	10	8	2	5	10	5	4	10	6
	National Development and Reform Commission	8	4	8	9	6	5	8	7	5
	Food and Drug Administration	10	8	2	8	5	7	9	8	3
	Administration for Industry and Commerce	15	3	2	13	6	1	13	6	1
	Public security organs, the Procuratorates and people's courts	8	4	8	8	7	5	14	3	3
Public medical institutions	Medical staff working at superior medical institutions	8	5	7	2	4	14	2	2	16
	Medical staff working at primary medical institutions	10	6	4	2	5	13	2	3	15
Private medical institutions	18	2	0	10	6	4	16	3	1	
The public (patients, dependents of patients and residents)	10	5	5	3	2	15	1	3	16	
Companies (suppliers of drugs, medical equipment and consumables)	10	7	3	4	4	12	5	6	9	
Centre for disease control and prevention	12	4	4	10	6	4	9	7	4	
Commercial insurance institutions	12	6	2	13	5	2	14	5	1	
Industrial association	7	6	7	11	7	2	10	7	3	
Media	Traditional media such as newspapers and news	8	10	2	14	3	3	15	4	1
	New media such as WeChat official accounts and Microblog.	12	5	3	11	5	4	12	4	4

Table 2: Support rate of stakeholders engaged in the tiered diagnosis and treatment

Stakeholders	Authority			Legitimacy			Urgency			
	Weak	Normal	Strong	Weak	Normal	Strong	Weak	Normal	Strong	
The Government	Health Administrative Department	0%	0%	100%	5%	5%	90%	5%	5%	90%
	Medical Insurance Department	10%	15%	75%	5%	25%	70%	15%	40%	45%
	Department of Finance	40%	30%	30%	40%	40%	20%	45%	30%	25%
	Price Department	50%	40%	10%	25%	50%	25%	20%	50%	30%
	National Development and Reform Commission	40%	20%	40%	45%	30%	25%	40%	35%	25%
	Food and Drug Administration	50%	40%	10%	40%	25%	35%	45%	40%	15%
	Administration for Industry and Commerce	75%	15%	10%	65%	30%	5%	65%	30%	5%
	Public security organs, the Procuratorates and people's courts	40%	20%	40%	40%	35%	25%	70%	15%	15%
	Medical staff working at superior medical institutions	40%	25%	35%	10%	20%	70%	10%	10%	80%
Public medical institutions	Medical staff working at primary medical institutions	50%	30%	20%	10%	25%	65%	10%	15%	75%
	Private medical institutions	90%	10%	0%	50%	30%	20%	80%	15%	5%
The public (patients, dependents of patients and residents)	Companies (suppliers of drugs, medical equipment and consumables)	50%	25%	25%	15%	10%	75%	5%	15%	80%
	Center for disease control and prevention	50%	35%	15%	20%	20%	60%	25%	30%	45%
	Commercial insurance institution	60%	20%	20%	50%	30%	20%	45%	35%	20%
Media	Industrial association	60%	30%	10%	65%	25%	10%	70%	25%	5%
	Traditional media such as newspapers and news	35%	30%	35%	55%	35%	10%	50%	35%	15%
	New media such as WeChat official accounts and Microblog.	40%	50%	10%	70%	15%	15%	75%	20%	5%
		60%	25%	15%	55%	25%	20%	60%	20%	20%



Table 3: Attribute score sheet of stakeholders engaged in tiered diagnosis and treatment

	Stakeholders	Power	Legitimacy	Urgency
The Government	Health Administrative Department	100.00	92.50	92.50
	Medical Insurance Department	82.50	82.50	65.00
	Department of Finance	45.00	40.00	40.00
	Price Department	30.00	50.00	55.00
	National Development and Reform Commission	50.00	40.00	42.50
	Food and Drug Administration	30.00	47.50	35.00
	Administration for Industry and Commerce	17.50	20.00	20.00
	Public security organs, the Procuratorates and people's courts	50.00	42.50	22.50
	Medical staff working at superior medical institutions	47.50	80.00	85.00
Public medical institutions	Medical staff working at primary medical institutions	35.00	77.50	82.50
	Private medical institutions	5.00	35.00	12.50
The public (patients, dependents of patients and residents)	Companies (suppliers of drugs, medical equipment and consumables)	32.50	70.00	60.00
	Centre for disease control and prevention	30.00	35.00	37.50
	Commercial insurance institution	25.00	22.50	17.50
Media	Industrial association	50.00	27.50	32.50
	Traditional media such as newspapers and news	35.00	22.50	15.00
	New media such as WeChat official accounts and Microblog.	27.50	32.50	30.00

Table 4: Weight and comprehensive score of stakeholders engaged in tiered diagnosis and treatment

Stakeholders	Authority		Legitimacy		Urgency		Comprehensive Score	
	Weight	Score	Weight	Score	Weight	Score		
The Government	Health Administrative Department	33%	33.33	33%	33.33	33%	33.33	100
	Medical Insurance Department	33%	26.67	33%	26.67	33%	26.67	80
	Department of Finance	20%	10.00	40%	8.00	40%	8.00	26
	Price Department	80%	16.00	10%	5.00	10%	5.00	26
	National Development and Reform Commission	10%	5.00	80%	16.00	10%	5.00	26
	Administration for Industry and Commerce	40%	8.00	20%	10.00	40%	8.00	26
	Administration for Industry and Commerce	0%	0.00	50%	0.00	50%	0.00	0
	Public security organs, the Procuratorates and people's courts	20%	10.00	40%	8.00	40%	8.00	26
Public medical institutions	Medical staff in higher-level medical institutions	70%	35.00	15%	12.00	15%	15.00	62
	Medical staff in primary medical institutions	80%	16.00	10%	8.00	10%	8.00	32
Private medical institutions		50%	0.00	0%	0.00	50%	0.00	0
The public (patients, relatives of patients, and residents)		80%	16.00	10%	8.00	10%	10.00	34
Companies (suppliers of drug, medical equipment and consumables)		80%	16.00	10%	8.00	10%	5.00	29
Centre for disease control and prevention		33%	6.67	33%	6.67	33%	6.67	20
Commercial insurance institution		0%	0.00	50%	0.00	50%	0.00	0
Industrial association		20%	10.00	40%	8.00	40%	8.00	26
Media	Traditional media such as newspapers and news, etc.	0%	0.00	50%	0.00	50%	0.00	0
	New media such as WeChat official accounts and Microblog, etc..	33%	6.67	33%	6.67	33%	6.67	20

**Appendix 10: Government staff's recognition of the tiered diagnosis and treatment, etc.**

Table 1: Government staff's recognition of the tiered diagnosis and treatment

Item	Category	Frequency	Percentage
Familiarity	Extremely familiar	37	21.64%
	Very familiar	58	33.92%
	Familiar	32	18.71%
	Not very familiar	33	19.30%
	Not at all	11	6.43%
Ways of knowing the tiered diagnosis and treatment system	Trainings by superior authorities	57	33.33%
	Company Trainings	67	39.18%
	Traditional media such as CCTV news and newspapers	12	7.02%
	Mobile We-media such as Microblog and WeChat official accounts	33	19.30%
	Family members, friends and colleagues	2	1.17%
Have your institution launched the implementation measures of the tiered diagnosis and treatment yet?	Other sources	0	0.00%
	Yes	97	56.73%
	No	12	7.02%
	Unclear	62	36.26%
Have your institution offered trainings related to the tiered	Yes	124	72.51%
	No	15	8.77%

diagnosis and treatment?	Unclear	32	18.71%
	Transfer treatment from primary medical institutions, second-level hospitals and tertiary hospitals	23	13.45%
The tiered diagnosis and treatment refers to	Disease treatment is graded by its seriousness, urgency and treatment difficulty. Medical institutions at different levels undertake the treatment of specific diseases to realize treatment from primary medical institutions and two-way transfer to appropriate medical institutions	148	86.55%
	Others	0	0.00%
Necessary to implement the tiered diagnosis and treatment or not	Yes	157	91.81%
	No	14	8.19%
	To promote the formation of a sound health care structure	152	96.82%
	To alleviate the medical burden of patients	143	91.08%
Reasons for developing such a system (multiple options)	To reduce work load of big hospitals	125	79.62%
	Others (to relieve financial pressure, maintain social stability, promote rational allocation of medical resources, improve gross national happiness index, promote the progress of medical level)	24	15.29%
	Community-level medical institutions still need to improve their treatment, which is unfavorable for continuous therapy	13	92.86%
Reasons for not developing such a system (multiple options)	The public has long accepted the non-tiered diagnosis and treatment system	12	85.71%
	It will limit the treatment autonomy of patients to a great extent	13	92.86%

	There is no effective interest distribution mechanism between community-level medical institutions and those of Class 2 and Class 3 hospitals	8	57.14%
	Others	0	0.00%
Satisfaction of the general implementation of the tiered diagnosis and treatment	Very satisfied	21	12.28%
	Satisfied	27	15.79%
	Acceptable but not satisfied	54	31.58%
	Dissatisfied	43	25.15%
	Very dissatisfied due to more conflicts	26	15.20%
	To define standards and systems of transfer treatment	105	61.40%
	To define scope of practice for medical institutions in different levels	87	50.88%
What supporting facilities or measures should be added if the tiered diagnosis and treatment is to be implemented (multiple options)	To improve medical technical skills of community-level medical institutions	163	95.32%
	To emphasize the training of grassroots medical staff	158	92.40%
	To enhance the equipment of community-level medical institutions	87	50.88%
	To improve differentiated payment system of medical insurance	92	53.80%
	To advance publicity for guiding better medical treatment	76	44.44%
	To clarify the risk sharing mechanism	45	26.32%
	Others (To increase the role of the market, the participation of social medical institutions and the participation of commercial insurance)	23	13.45%

	Very low	54	31.58%
The participation of private capital in the tiered diagnosis and treatment	Low	79	46.20%
	Limited	38	22.22%
	High	0	0.00%
	Very high	0	0.00%
	Promising	63	36.84%
View on their participation in community medical treatment	With probably potential market opportunities but unable of fulfilling the public needs	72	42.11%
	Difficult	32	18.71%
	Unknow	4	2.34%
	Abundant financial resources	59	93.65%
Reasons for the promising future of private capital to invest in the community medical treatment (multiple options)	Attractive to doctors with high salary	61	96.83%
	Strong brand and marketing capabilities	57	90.48%
	Good facilities and techniques	21	33.33%
	Others (different positioning like high-end medical services and introducing foreign medical groups)	5	7.94%
	Hard to attract skillful doctors	87	83.65%
Reasons for the difficult future of private capital to develop in the community medical treatment market (multiple options)	Demand policy support	72	69.23%
	Too expensive for the general public	81	77.88%
	Others	12	11.54%

Table 2: Government staff's appeals of the tiered diagnosis and treatment

Number	Appeal Item	Average Value	Standard Deviation
Q29	Improvement in allocation of medical resources	4.39	0.68
Q12	Fair competition and reciprocal cooperation between hospitals	4.30	0.85
Q27	Improvement of medical treatment at community hospitals to alleviate the work load of big hospitals	4.26	0.80
Q28	Improvement in resource utilization of community-level medical institutions	4.22	0.83
Q9	Necessary working facilities provided by the community-level medical institutions	4.12	0.85
Q21	Highly efficient two-way transfer pathway	4.01	0.89
Q22	Strict primary treatment at community level to facilitate the formation of tiered diagnosis and treatment	3.94	0.98
Q32	Establishment of proper medical insurance policy on medical treatment combination	3.88	0.94
Q26	Establishment of proper medical insurance policy on medical treatment combination	3.85	1.03
Q25	Alleviation of the medical burden on patients	3.77	0.99
Q5	Social and patient's satisfaction	3.71	1.04
Q7	Patients' rights and interests such as the right to know	3.67	1.07
Q8	Proper treatment and prescription	3.64	1.03
Q33	Rational examination and treatment according to the patient's condition	3.60	1.08
Q10	Highly efficient, convenient and affordable basic health care and humanistic care for the public	3.57	0.99
Q1	Asset-liability ratio of hospitals	3.54	1.19
Q2	Net asset growth rate of hospitals	3.37	1.22
Q3	Business expense and revenues of hospitals	3.32	1.28
Q4	Proportion of drugs and expensive consumables in the total revenues	3.29	1.12
Q15	Proportion of drugs and expensive consumables in the	3.21	1.18

	total revenues		
Q23	Lower cost, waste avoidance and efficiency improvement	3.12	1.14
Q18	Implementation of related policies on price management, use of essential medicines and clinical pathway management	3.08	1.32
Q6	Strict implementation of the charge policy on medical services	3.05	1.32
Q31	Strict implementation of charging standards	2.99	1.27
Q14	Observance of the performance evaluation and management system of comprehensive goals	2.95	1.23
Q13	Observance and implementation of medical quality and safety systems	2.92	1.29
Q16	Review and inspection by health administration department	2.89	1.14
Q17	Medical staff shall have the qualification for practice	2.83	1.26
Q24	Proper disposal of wastes	2.81	1.26
Q34	Sufficient supply of medicine in the medical insurance catalogue	2.79	1.26
Q35	Rational prescription of medicine beyond the medical insurance catalogue	2.77	1.21
Q30	Improvement in management system of medical insurance information	2.74	1.20
Q11	Improved medical ethics and morality construction and performance evaluation system	2.71	1.24
Q19	Completion of tasks commanded by the government such as regional emergencies and medical assistance	2.70	1.20
Q20	Active participation in community health education and disease prevention and publicity	2.69	1.23



Table 3: Recognition of the tiered diagnosis and treatment form staff at superior medical institutions

Item	Category	Frequency	Percentage
Familiarity	Extremely familiar	12	6.49%
	Very familiar	62	33.51%
	Familiar	56	30.27%
	Not very familiar	42	22.70%
	Not at all	13	7.03%
How did you get to know the tiered diagnosis and treatment system?	Training of health administrative department	15	8.11%
	Company training	12	6.49%
	Traditional media such as CCTV news and newspapers	20	10.81%
	Mobile We-media such as Microblog and WeChat official accounts	97	52.43%
	Family members, friends and colleagues	35	18.92%
	Other sources	6	3.24%
Have your medical institution already launched the implementation measures of the tiered diagnosis and treatment yet?	Yes	20	10.81%
	No	9	4.86%
	Unclear	156	84.32%
Have your medical institution offered trainings related to the tiered diagnosis and treatment	Yes	46	24.86%
	No	107	57.84%
	Unclear	32	17.30%
The tiered diagnosis and treatment refers to?	Transfer treatment from community-level medical institutions, second-level hospitals and tertiary hospitals to superior hospitals	34	18.38%
	Disease treatment is graded by its seriousness, urgency and treatment difficulty. Medical institutions at different levels undertake the treatment of specific diseases to realize treatment from community-level medical institutions and two-way transfer to appropriate medical institutions	151	81.62%
	Others	0	0.00%

Is there any transfer indicator passed to your department by your medical institution?	Yes	23	12.43%
	No	96	51.89%
	Unclear	66	35.68%
Has your department ever received any patient transferred from community-level medical institutions?	Yes	157	84.86%
	No	28	15.14%
	Less than 30%	32	17.30%
How many of outpatients can be usually treated at community-level medical institutions?	31%-50%	69	37.30%
	51%-80%	61	32.97%
	More than 80%	23	12.43%
	0	32	17.30%
	Less than 10	22	11.89%
The number of patients transferred from community-level medical institutions have you received in the past two months	11-20	21	11.35%
	21-30	46	24.86%
	31-40	33	17.84%
	41-50	24	12.97%
	More than 50	7	3.78%
	Patients suffering from common and frequently-occurring disease	62	33.51%
	Patients suffering from complex diseases	107	57.84%
Types of patients have you received (multiple choices)	Patients suffering from serious diseases	126	68.11%
	Patients in need of special examinations unavailable at community-level medical institutions	92	49.73%
	Requirement of patients and their dependents	103	55.68%
	Would you transfer inpatients in need of rehabilitation to community-level medical	Yes	105

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institutions?	No	80	43.24%
Reasons for transferring your patients to community-level medical institutions (multiple choices)	To increase patient bed turnover efficiency and ameliorate medical burdens on patients	93	50.27%
	To provide convenience to the patients	48	25.95%
	To follow policy and regulation	32	17.30%
	Others	12	6.49%
	Lack of standards and regulations on such transfer	42	22.70%
Reasons for not transferring your patients to community-level medical institutions (multiple choices)	Medical treatment to be improved at community-level medical institutions, which may affect continuous high-quality treatment for the patients	76	95.00%
	Unwillingness of transferring the patients to community-level medical institutions due to declined business income	43	53.75%
	Patients' behavior of medical treatment and unwillingness of transfer	72	90.00%
	Others	12	15.00%
Have you gone through procedures for patients in the past two months?	Yes	72	38.92%
	No	113	61.08%
If yes, what do you think about the procedures?	Too complicated	9	12.50%
	Not too troublesome	41	56.94%
	Very efficient and convenient	22	30.56%
Whether is there any patient under your treatment who has been engaged in any conflict because of transfer procedures in the past two months?	Yes	8	11.11%
	No	64	88.89%
Are you satisfied with the transfer process?	Very satisfied	9	12.50%
	Satisfied	26	36.11%
	Acceptable but not satisfied	12	16.67%
	Dissatisfied	24	33.33%
	Very dissatisfied	1	1.39%
During the transfer process, which parts do you	Difficulty in communicating with patients due to low recognition of the transfer process	5	20.00%

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find unsatisfying/extremely unsatisfying (multiple choices) ?	Lack of personnel in full charge of transfer at the hospital and complex operation process	2	8.00%
	Incapability of the community-level medical institutions in receiving, continuously treating and tracking the referred patients	12	48.00%
	Difficulty in practice because of indefinite standards and regulations on patient transfer	6	24.00%
The necessity of carrying out tiered diagnosis and treatment?	Yes	125	67.57%
	No	60	32.43%
Reasons for the necessity of carrying out tiered diagnosis and treatment? (multiple choices)	It can stimulate the formation of reasonable medical treatment	96	76.80%
	It can ameliorate the patients' medical burdens for the convenience of the patients	82	65.60%
	It can relieve stress of superior hospitals	73	58.40%
	It can maximize efficient and effective usage of medical resources	99	79.20%
	Others	13	10.40%
Reasons for the no necessity of carrying out tiered diagnosis and treatment? (multiple choices)	The community-level medical institutions have to improve their professional skills, which are not favorable to the patients' continuous medical treatment	52	86.67%
	The public has formed a long-term concept of receiving medical treatment and won't easily accept tiered diagnosis and treatment	46	76.67%
	It has seriously restricted the choices made by the patients	35	58.33%
	There has been no proper and effective profit distribution mechanism between second-level and tertiary hospitals and community-level medical institutions	26	43.33%
	Others	0	0.00%
Satisfaction of the tiered diagnosis and treatment	Extremely satisfied	9	4.86%
	Not so satisfied	42	22.70%
	Unsatisfied, but acceptable	114	61.62%
	Extremely unsatisfied due to the increase of medical conflicts	20	10.81%
Reasons for impeding the progress of tiered diagnosis and treatment	Lack of talents for medical treatment as a whole	102	55.14%
	Lack of talents for primary medical treatment	138	74.59%
	Incapability of primary medical care institutions	133	71.89%
	Poor hardware infrastructure of primary care institutions	82	44.32%

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	low trust in primary care by patients	89	48.11%
	Insufficient policy support	62	33.51%
	Small gap in costs between treatment in community-level medical institutions and superior hospitals	73	39.46%
	Insufficient publicity by the government	86	46.49%
	No such obstruction	0	0.00%
	Others	0	0.00%
	Definite standards and policies for patient transfer	93	50.27%
	Definite business scope of medical institutions of different levels	82	44.32%
Requirements for realizing the tiered diagnosis and treatment (multiple choices)	Enhancement of professional skills of community-level medical institutions	133	71.89%
	Emphasis on talent development for primary medical treatment	126	68.11%
	Improvement of differentiated payment policy for medical insurance	89	48.11%
	Enhancement of publicity to guide the public in medical treatment	92	49.73%
	Others	0	0.00%
In which ways do you think the internet medical treatment could contribute to tiered diagnosis and treatment (multiple choices)?	Remote medical care	163	88.11%
	Care of chronic diseases	103	55.68%
	Registration reservation	172	92.97%
	Others	0	0.00%

Table 4: Appeals of the tiered diagnosis and treatment from staff at superior medical institutions

Numerical Number	Appeal Item	Average Value	Standard Deviation
Q10	The community-level medical institutions can provide me with sound benefits on safety, compensation for medical dispute and travel insurance, etc.	4.35	0.75
Q1	To increase my income.	4.30	0.72
Q3	To enable faster promotion by providing instructions at community-level medical institutions.	4.17	0.81
Q7	To be recognized by the leaders and colleagues, share my workload by providing instructions at member hospitals of the medical treatment combination.	4.02	0.91
Q4	My performance at community-level medical institutions can be taken into consideration during my performance review at the hospital.	4.01	0.86
Q21	The administrative department is expected to grant me more freedom of practice.	3.90	0.99
Q12	To ask for my suggestions when it's about my personal interest at community-level medical institutions.	3.88	0.95
Q11	The community-level medical institutions can provide me with a good assisting team who will support and respect me.	3.88	0.94
Q25	To ameliorate medical burdens on the patients.	3.86	0.89
Q20	The government's medical insurance department is expected to increase the reimbursement proportion of tiered diagnosis and treatment, guide patients to receive medical treatment at our hospital.	3.85	1.01
Q14	To relieve stress at my work.	3.84	1.02
Q24	To standardize the management of community-level medical institutions.	3.79	1.03
Q5	My medical and management techniques can be adopted and applied to community-level medical institutions.	3.79	1.01
Q26	To bring about more convenience to the patients for medical treatment.	3.75	0.97
Q19	To relieve the outpatient stress of our hospital in	3.73	0.96

	the course of promoting tiered diagnosis and treatment system.		
Q23	To increase the income of community-level medical institutions.	3.69	1.07
Q22	To intensify the medical competency of community-level medical institutions.	3.63	1.07
Q18	The community-level medical institutions can accept patients transferred by our hospital to relieve the stress of hospitalization via the promotion of tiered diagnosis and treatment system and the establishment of medical treatment combination.	3.59	1.05
Q13	To win reputation and recognition by the government and the public for the hospital I'm working for.	3.56	1.00
Q16	To increase the hospital's income in the course of promoting the tiered diagnosis and treatment system and establishing the medical treatment combination.	3.50	1.09
Q17	To receive more patients transferred from the community-level medical institutions through the promotion of tiered diagnosis and treatment system and establishment of medical treatment combination.	3.44	1.07
Q15	To win bigger market share for the hospital via the promotion of tiered diagnosis and treatment system and the establishment of medical treatment combination.	3.14	1.19
Q8	The community-level medical institutions can provide me with the necessities for life.	3.03	1.17
Q2	To help me build connection with more patients.	2.99	1.24
Q9	The community-level medical institutions can provide me with the necessities for work.	2.93	1.29
Q6	To gain social recognition and improve social influence through work guidance at community-level medical institutions.	2.75	1.24

Table 5: Recognition of the tiered diagnosis and treatment from staff at community-level medical institutions

Item	Category	Frequency	Percentage
Familiarity	Extremely familiar	9	4.71%
	Very familiar	55	28.80%
	Familiar	62	32.46%
	Not very familiar	59	30.89%
	Not at all	6	3.14%
How did you get to know the tiered diagnosis and treatment system?	Training of health administrative department	46	24.08%
	Company training	5	2.62%
	Traditional media such as CCTV news and newspapers	33	17.28%
	Mobile We-media such as Microblog and WeChat official accounts	74	38.74%
	Family members, friends and colleagues	24	12.57%
	Other sources	9	4.71%
	Have your medical institution already launched the implementation measures of the tiered diagnosis and treatment yet?	Yes	32
No		12	6.28%
Unclear		147	76.96%
Have your medical institution offered trainings related to the tiered diagnosis and treatment	Yes	57	29.84%
	No	103	53.93%
	Unclear	31	16.23%
The tiered diagnosis and treatment refers to?	Transfer treatment from community-level medical institutions, second-level hospitals and tertiary hospitals to superior hospitals	42	21.99%



	Disease treatment is graded by its seriousness, urgency and treatment difficulty. Medical institutions at different levels undertake the treatment of specific diseases to realize treatment from community-level medical institutions and two-way transfer to appropriate medical institutions	149	78.01%
	Others	0	0.00%
Is there any transfer indicator passed to your department by your medical institution?	Yes	48	25.13%
	No	82	42.93%
	Unclear	61	31.94%
	Less than 30%	46	24.08%
How many patients under your treatment can usually be treated at community-level medical institutions?	31%-50%	87	45.55%
	51%-80%	39	20.42%
	More than 80%	19	9.95%
	To enhance professional skills of staff working at community-level medical institutions	98	51.31%
The influences brought about by providing patients with initial treatment at community-level medical institutions (multiple choices)	To increase the income of staff working at community-level medical institutions	87	45.55%
	To benefit the patients for receiving prompt and continuous medical treatment	62	32.46%
	To benefit the society to more concern the development of primary medical treatment	126	65.97%
	Others	7	3.66%
What makes your medical institution incapable of	Lack of medical staff, lack of professional skills	98	51.31%

fulfilling the requirements of patient transfer (multiple choices)?	Obsolete medical equipment	24	12.57%
	Lack of specific standards and procedures for patient transfer	19	9.95%
	Insufficient policy on medical insurance to encourage the public to come for treatment	33	17.28%
	No authority of forcing the patients to be transferred to the community-level medical institutions	17	8.90%
	Others	0	0.00%
How many patients transferred from superior medical institutions have you received/managed in the past two months?	0	97	50.79%
	Less than 10	56	29.32%
	11-20	30	15.71%
	21-30	8	4.19%
	31-40	0	0.00%
	41-50	0	0.00%
	More than 50	0	0.00%
What types of patients have you received/managed more?	Patients suffering from common and frequently-occurring disease with definite diagnostic result and treatment plan	96	50.26%
	Patients in the stage of rehabilitation or recovery	34	17.80%
	Transfer downwards as requested by the patient/dependent	18	9.42%
	Palliative care	43	22.51%
	Others	0	0.00%
Have you ever handled patient transfer in the past two months?	Yes	158	82.72%
	No	33	17.28%
The mostly common reasons for patient transfer to	The medical devices cannot meet the patients' need for treatment	89	46.60%

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superior hospitals include (multiple choices)	The medicine cannot meet the patients' need for treatment	98	51.31%
	The patients and their dependents strongly request transfer	122	63.87%
	The patients' diseases are beyond the treatment scope of community-level medical institutions	145	75.92%
	The patients are unwilling to take any potential risks	133	69.63%
	Others	12	6.28%
If yes, what do you think about the procedures?	Too complicated	21	13.29%
	Not too troublesome	86	54.43%
	Very efficient and convenient	51	32.28%
Is there any patient under your treatment who has been engaged in any conflict because of transfer procedures in the past three months?	Yes	13	8.23%
	No	145	91.77%
Do you find it necessary to carry out tiered diagnosis and treatment?	Yes	146	76.44%
	No	45	23.56%
Please specify the reasons if you find it necessary to carry out tiered diagnosis and treatment (multiple choices)	It can stimulate the formation of reasonable medical treatment	123	84.25%
	It can reduce the patients' medical burden for the convenience of the patients	116	79.45%
	It can reduce the stress of superior hospitals	89	60.96%
Please specify the reasons if you find it unnecessary to carry out tiered diagnosis and treatment (multiple choices)	Others	5	3.42%
	The community-level medical institutions have to improve their professional skills, which are not favorable to the patients' continuous medical treatment	43	95.56%
	The public has formed a long-term concept of receiving medical	40	88.89%

	treatment and won't easily accept tiered diagnosis and treatment		
	It has seriously restricted the choices made by the patients	34	75.56%
	There has been no proper and effective profit distribution mechanism		
	between second-level and tertiary hospitals and community-level	31	68.89%
	medical institutions		
	Others	4	8.89%
	Very satisfied	9	4.71%
	Satisfied	33	17.28%
	Acceptable but not satisfied	38	19.90%
	Dissatisfied	64	33.51%
	Very dissatisfied due to more conflicts	47	24.61%
	Definite standards and policies for patient transfer	98	51.31%
	Definite business scope of medical institutions at different levels	77	40.31%
	Enhancement of professional skills at community-level medical		
	institutions	145	75.92%
How do you evaluate the general implementation of the tiered diagnosis and treatment?	Emphasis on talent development for primary medical treatment	152	79.58%
	Intensification of equipment construction at community-level medical		
	institutions	87	45.55%
	Perfection of differentiated payment system for medical insurance	92	48.17%
	Intensification of publicity to guide the public in medical treatment	108	56.54%
	Definite risk-sharing mechanism	133	69.63%
	Others	0	0.00%
Which supporting conditions or measures are still required to realize the tiered diagnosis and treatment (multiple choices)?			

Table 6: Appeals of the tiered diagnosis and treatment from community-level medical institutions

Numerical Number	Appeal Item	Average Value	Standard Deviation
Q9	To get instructions and assistance from experts of the hospital.	4.43	0.71
Q10	To get opportunity of training and further education to improve my professional skills.	4.39	0.77
Q1	To gain reasonable salary commensurate with my contribution to increase my income.	4.37	0.76
Q4	To receive sound safety guarantee.	4.25	0.90
Q11	To have reasonable and proper mechanism for professional promotion.	4.23	0.97
Q2	To have better welfare.	4.07	0.88
Q16	To expect the competent administration department to further grant me more freedom of practice.	4.04	0.99
Q20	To ameliorate medical burdens on the patients.	3.96	0.96
Q17	To intensify the capacity for diagnosis and treatment of community-level medical institutions	3.81	0.93
Q15	To increase the utilization of resources at primary care institutions.	3.71	0.98
Q8	To get support and respect while cooperating with staff working at superior medical institutions.	3.65	0.98
Q13	To acquire comments of the medical staff working at community-level medical institutions when their interests are involved in decision-making.	3.62	1.01
Q21	To be more convenient for patients to receive medical treatment.	3.53	0.98
Q18	To increase the income of community-level medical institutions.	3.50	1.06
Q14	To increase the proportion of reimbursement in tiered diagnosis and treatment and guide patients to receive medical treatment at community-level medical institutions.	3.47	1.11
Q12	To take into consideration of the employees' suggestions for decision-making on important affairs.	3.38	1.12
Q19	To standardize the management of community-level medical institutions	3.20	1.18
Q7	To get concerns and support from the leaders.	3.15	1.22
Q6	To comparatively relieve the pressure at work.	3.06	1.19
Q5	Reasonable working time	2.94	1.24
Q3	To have nice environment for diagnosis, treatment and work	2.87	1.24

Table 7: Public recognition of tiered diagnosis and treatment

Item	Category	Frequency	Percentage
Familiarity	Extremely familiar	3	1.70%
	Very familiar	12	6.82%
	Familiar	24	13.64%
	Not very familiar	43	24.43%
	Not at all	94	53.41%
How did you get to know the tiered diagnosis and treatment system	From the hospital personnel or health technicians	11	6.25%
	From community-level medical institution personnel or health technical personnel	56	31.82%
	Community publicity	34	19.32%
	Traditional media such as CCTV and newspapers	23	13.07%
	We-media such as Microblog and WeChat public accounts, etc.	44	25.00%
	Recommendations by family members, friends or colleagues	8	4.55%
	Others	0	0.00%
	The patient transfer upwards following the order of community-level medical institutions, second-level and tertiary hospitals	99	56.25%
Tiered diagnosis and treatment refers to	The medical treatment classified by the seriousness and urgency of illness, the difficulty in treatment the medical institutions at different levels will treat different diseases to realize primary treatment at community-level medical institutions and two-way patient transfer	77	43.75%
	Others	0	0.00%
Have you heard about tiered diagnosis and treatment?	Yes	35	19.89%
	No	141	80.11%
How many times have you received medical treatment in	0	53	30.11%
	1-2	82	46.59%

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the health clinic in town/ community health center in the past six months?	3-4	32	18.18%
	Above 5	9	5.11%
How many times have you received medical treatment in comprehensive large hospitals (including county/district level hospitals, provincial/municipal level-3 hospitals) in the past six months?	0	21	11.93%
	1-2	87	49.43%
	3-4	22	12.50%
	Above 5	46	26.14%
How long does it take for you to walk to the nearest health clinic in town or community health center?	Within 5	31	17.61%
	5-15	52	29.55%
	15-30	83	47.16%
	Over 30	8	4.55%
	Unclear	2	1.14%
Would you prefer the health clinic in town or community health centre when you are sick?	Yes	35	19.89%
	No	103	58.52%
	Depend on the seriousness of illness	38	21.59%
The reasons why you prefer health clinic in town or community health center firstly include (multiple choices)	Low cost for medical treatment	6	17.14%
	Short distance from home, which makes it more convenient	21	60.00%
	Common and frequently-occurring diseases	31	88.57%
	Good service attitudes of the medical staff	12	34.29%
	The doctors are more familiar with my health condition	16	45.71%

	I trust the doctors' professional skills	3	8.57%
	I can access relevant information of disease prevention and healthcare	5	14.29%
	It's a designated medical insurance institution with high proportion of reimbursement	14	40.00%
	It's just a personal habit	11	31.43%
	It's just for the purpose for prescription and getting the medicine	28	80.00%
	Others	1	2.86%
	Incompetency of the doctors	97	94.17%
	Incomplete medical equipment for patient examination	83	80.58%
	Poor treatment environment	20	19.42%
	Serious state of illness	46	44.66%
	Insufficient medicines at primary care institutions	72	69.90%
	Just personal habit	91	88.35%
	Very small cost gap among different levels of medical institutions	80	77.67%
	Others	1	0.97%
The reasons why you are unwilling to go to the health clinic in town or community health center firstly might be (multiple choices)	Yes	71	40.34%
	No	105	59.66%
Do you know the two-way transfer service between superior hospitals and health clinic in town/community health center?	From hospital or its medical personnel	7	9.86%
	From primary medical institutions or its medical personnel	33	46.48%
	From the community publicity	2	2.82%
	Traditional media like CCTV and newspapers	10	14.08%
	We-media such as Microblog and WeChat public accounts	9	12.68%
How did you know about the two-way transfer service (multiple choices)?			



	Recommendations by family members, friends or colleagues	10	14.08%
	Others	0	0.00%
Have you ever experienced transfer before?	Yes	92	52.27%
	No	84	47.73%
The transfer you have experienced followed	Oral recommendation by the doctor	43	46.74%
	Relevant transfers procedure	16	17.39%
	My or my family members' requirement	33	35.87%
During the course of transfer, which do you find unsatisfying (multiple choices)?	I cannot choose the hospital to transfer to except those within the medical treatment combination	67	72.83%
	unaware of the transfer flow and standards	63	68.48%
	No cost discount	15	16.30%
	Too complicated transfer procedures	21	22.83%
	Extra cost for transfer	0	0.00%
	Repeated examinations	58	63.04%
	Long time waiting for treatment after transfer without green channel service	23	25.00%
	Others	0	0.00%
In your opinions, what can you benefit from the transfer? (Multiple choices)	Efficient procedures for medical treatment with reduced waiting time	61	66.30%
	Timely and continuous treatment for the disease	67	72.83%
	Increased proportion of medical insurance reimbursement to save medical costs	54	58.70%
	No need for repeated examinations	21	22.83%
	No benefits	0	0.00%
	Unclear	0	0.00%
	Others	0	0.00%
What do you think about the	Extremely agree	13	7.39%

policy that “the proportion of medical insurance reimbursement shall be increased for transferred patients”	Agree	79	44.89%
	Disagree	42	23.86%
	Extremely disagree	28	15.91%
	I don’t care	14	7.95%
Is it necessary to implement tiered diagnosis and treatment?	Yes	72	40.91%
	No	104	59.09%
Reasons why you find it necessary to carry out tiered diagnosis and treatment (multiple choices)	It can stimulate the formation of reasonable medical treatment	46	63.89%
	It can reduce patients’ medical burden and become more convenient for them	43	59.72%
	It can reduce a lot of stress of large hospitals	67	93.06%
	Others	0	0.00%
	The current incompetency of primary medical institutions is uncondusive to carry out continuous treatment for the patients	98	94.23%
Reasons why you find it unnecessary to carry out tiered diagnosis and treatment (multiple choices)	The public has formed a long-term concept of receiving medical care and won’t easily welcome tiered diagnosis and treatment	94	90.38%
	It will seriously restrict choices by patients	102	98.08%
	There hasn’t been an effective benefit distribution mechanism between primary medical institutions and second-level and tertiary hospitals	61	58.65%
	Others	0	0.00%
What do you think about the tiered diagnosis and treatment generally?	Very satisfied	9	5.11%
	Satisfied	36	20.45%
	Acceptable but not satisfied	32	18.18%
	Dissatisfied	67	38.07%
	Very dissatisfied due to more conflicts	32	18.18%

Table 8: Interest appeals of staff from public on tiered diagnosis and treatment

No.	Interest appeal items	Average value	Standard deviation
Q18	To guarantee the safety of medical services	4.43	0.73
Q7	To seek medical treatment in a more convenient and highly efficient manner	4.37	0.74
Q5	To reduce the waiting time for outpatient services at superior hospitals	4.33	0.80
Q11	To get access to medical treatment in time at nearby medical institutions	4.31	0.83
Q10	To recognize the diagnosis results mutually among hospitals within medical treatment combination for the purpose of reducing unnecessary repeated examinations.	4.26	0.81
Q6	To reduce the waiting time for hospitalization at superior hospitals	4.22	0.85
Q9	To set up highly efficient patient transfer channel between hospitals within medical treatment combination.	4.19	0.81
Q19	Patients can select medical care staff within the medical treatment combination at their discretion.	4.12	0.86
Q16	The medical services provided by all medical institutions shall comply with standards for diagnosis and treatment.	4.08	0.93
Q2	To reduce the cost for medical treatment	4.03	0.92
Q3	To choose supportable treatment plan according to patients' exact sickness	3.95	0.98
Q22	To reduce the patient's burdens by eliminating unnecessary examinations and prescription	3.89	0.98
Q1	To avoid unreasonable charges	3.84	1.01
Q29	To provide the payment list and the cost inquiry service on the daily basis.	3.81	0.94
Q28	To publicize the hospitals' charging items and information	3.77	0.98
Q4	To increase the proportion of reimbursement in a step-by-step manner, enjoy more preferential medical insurance for initial treatment at town/community health center, e.g.: to increase the proportion of reimbursement for initial treatment at town/community health center.	3.66	1.12
Q20	To treat every patient equally.	3.58	1.06

Q24	The medical personnel are obliged to protect the patients' privacy.	3.49	1.18
Q25	To explain to patients the purpose of specific examinations and treatment in advance	3.37	1.07
Q26	To acquire the patient's approval before implementing the treatment plan	3.01	1.23
Q23	The medical personnel shall listen to the patients patiently to better know the state of illness.	2.96	1.26
Q27	To deal with complaints and suggestions proposed by patients and their families properly	2.92	1.19
Q30	To provide multiple channels to receive complaints from patients and their family members (telephone line, mailbox, etc.)	2.87	1.30
Q8	To enable medical experts from superior hospitals to practice at lower level hospitals on a regular basis.	2.75	1.25
Q13	To highlight high level expertise and technical skills at primary medical institutions.	2.72	1.18
Q15	Not to do examinations at superior hospitals as primary medical institutions have been equipped with advanced medical equipment.	2.70	1.29
Q21	To manage the primary medical institutions in a standard manner.	2.68	1.30
Q17	To increase the resource utilization of primary medical institutions	2.64	1.25
Q14	To feature sound medical environment at primary medical institutions.	2.61	1.23
Q12	To increase primary medical institutions.	2.58	1.17
Q31	To establish the family doctor system	2.51	1.20
Q32	To provide the on-site medical service	2.47	1.23
Q33	To carry out health education to the public on a regular basis	2.36	1.14

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Table 9: Enterprise staff's recognition about tiered diagnosis and treatment

Item	Category	Frequency	Percentage
Familiarity	Extremely familiar	0	0.00%
	Very Familiar	17	8.99%
	Familiar	29	15.34%
	Not familiar	41	21.69%
	Not at all	102	53.97%
How did you know about the tiered diagnosis and treatment system?	Trainings by superior authorities	0	0.00%
	On-job training	0	0.00%
	Traditional media like CCTV and newspapers	53	28.04%
	We-media such as Microblog and WeChat public accounts	76	40.21%
	Recommendations by family, friends or colleagues	39	20.63%
	Others	21	11.11%
Is there any training done on tiered diagnosis and treatment at your institution?	Yes	0	0.00%
	No	92	48.68%
	Unknown	97	51.32%
Tiered diagnosis and treatment refers to	Transfer in the order from community-level medical institution to second-level and tertiary hospitals	109	57.67%
	medical treatment prioritized by the seriousness of illness, difficulty in treatment and medical institutions at different levels for specific treatment to realize initial treatment by community-level institutions and two-way transfer	80	42.33%
Is it necessary to implement tiered diagnosis and treatment?	Others	0	0.00%
	Yes	87	46.03%
	No	102	53.97%

Reasons why you find it necessary to carry out tiered diagnosis and treatment (multiple choices)	It can stimulate the formation of reasonable medical treatment	84	96.55%
	It can reduce patients' medical burden and become more convenient for them	67	77.01%
	It can reduce a lot of stress of large hospitals	79	90.80%
	Others	0	0.00%
Reasons for why you find it unnecessary to carry out tiered diagnosis and treatment (multiple choices)	The current incompetency of primary medical institutions is unconducive to carry out continuous treatment for the patients	83	81.37%
	The public has formed a long-term concept of receiving medical care and won't easily welcome tiered diagnosis and treatment	79	77.45%
	It will seriously restrict choices by patients	86	84.31%
	There hasn't been an effective benefit distribution mechanism between primary medical institutions and second-level and tertiary hospitals	57	55.88%
	Others	0	0.00%
What do you think about the overall implementation of tiered diagnosis and treatment?	Very satisfied	2	1.06%
	Satisfied	24	12.70%
	Acceptable but not satisfied	61	32.28%
	Dissatisfied	74	39.15%
	Very dissatisfied due to more conflicts	28	14.81%
In your opinion, what are required to realize tiered diagnosis and treatment (multiple choices)?	Clear standards and policies for patient transference	93	49.21%
	Definite business scope of medical institutions of different levels	134	70.90%
	Professional skill enhancement of community-level medical institutions	157	83.07%
	Awareness of talent development for primary care	143	75.66%
	Strengthening equipment construction of community-level medical institutions	78	41.27%
Improving payment policy for medical insurance differentiation	○ Increasing promotion to	89	47.09%

	instruct the public		
	Increasing promotion to instruct the public	122	64.55%
	Identified risk-sharing mechanism	62	32.80%
	Others	0	0.00%
The level of enterprise's participation in the tiered diagnosis and treatment	Extremely low	144	76.19%
	Quite Low	23	12.17%
	Fair	22	11.64%
	Quite high	0	0.00%
	Extremely high	0	0.00%
Which enterprises in your opinions mostly participate in tiered diagnosis and treatment?	Medicine suppliers	45	23.81%
	Suppliers of medical devices and medical materials	12	6.35%
	No idea	132	69.84%
The extent of influence of enterprises on the tiered diagnosis and treatment	Extremely Little	23	12.17%
	little	76	40.21%
	Fair	90	47.62%
	Huge	0	0.00%
	Extremely huge	0	0.00%
The extent of influence of tiered diagnosis and treatment on enterprises	Extremely Little	21	11.11%
	little	86	45.50%
	Fair	82	43.39%
	Huge	0	0.00%
	Extremely huge	0	0.00%

Table 10: Enterprise staff's interest appeal on tiered diagnosis and treatment

No.	Interest appeal item	Average value	Standard deviation
Q1	To increase personal income	4.31	0.77
Q2	To actively participate in tiered diagnosis and treatment, and get promotion opportunities	4.26	0.79
Q15	To increase the medicine categories of primary medical institutions	4.22	0.83
Q16	To expand the insurance coverage on medicine	4.06	0.86
Q14	To increase the medicine categories in <i>National Essential Drug List</i>	3.95	0.91
Q12	To increase the enterprise's participation in tiered diagnosis and treatment	3.81	0.98
Q13	To increase the enterprises' influence on the execution of tiered diagnosis and treatment	3.78	1.04
Q3	To actively participate in tiered diagnosis and treatment, increase the enterprise's income	3.76	0.95
Q5	To actively participate in tiered diagnosis and treatment, get government funding on enterprises' research and development	3.73	0.98
Q6	To expand the enterprise's product category	3.62	1.06
Q9	To increase the product's recognition by primary medical institutions	3.61	1.13
Q7	To increase the enterprise's sales volume	3.59	1.11
Q10	To increase the product's recognition by superior medical institutions	3.48	1.01
Q11	To expand the products' market share	3.32	1.19
Q4	To actively participate in tiered diagnosis and treatment, to reduce the enterprise taxes	3.13	1.27
Q8	To enhance the enterprise's brand reputation	3.01	1.26