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The Impact of the Medical Treatment Combination Model on Stakeholders and Patient Flow in a Chinese County

WANG Xueping

Doctor of Management

Supervisors:

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ISCTE University Institute of Lisbon

PhD Wu Wei, Professor,
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Abstract

Background and purpose

Since China's reform and opening up, people's demands for health service have increased, and requirements for healthcare service are higher with the rapid development of society and economy. Based on the reality of a county in China, the new operation and management model of medical reform—the Medical Treatment Combination Model—is established and implemented. This model integrates the medical resources in the county, reform the payment method of medical insurance, shift the management of medical institutions to profit-seeking, and realize the united pursuit of medical institutions, doctors and patients, thus achieving the goal of safeguarding the health of the county's residents.

Data source and research method

Data source: this thesis used data from interviews to the stakeholders, statistics from health department and healthcare security department of Dancheng (DC) county, Henan province (HN) in China; annual reports, statistical reports, data from the Ministry of Health and other national authorities; documents from the State Council, the Ministry of Health, the Healthcare Security Administration and other relevant authorities of China.

Research method: Through the content analysis of the interviews and statistic analysis of the data, the impact of the Medical Treatment Combination Model, or the new operation model featuring “the integration of county and township medical institutions into medical group operation (MHG) + integrated medical insurance package payment (IBPMI)”, namely, the MHG+IBPMI model (MHG+IBPMI) on the stakeholders and flow of patients in a county-level region is observed, to provide reference for China's regional medical reform.

Conclusion

The establishment and implementation of the new operation and management mode in a county of China, namely the Medical Treatment Combination Mode (MHG+IBPMI), effectively shifts hospital's original operation direction of profit-seeking, and realizes orderly patient flow, so that medical resources and hierarchical medical treatment can be achieved. Thus, it improves the utilization rate of medical resources in township healthcare centers, while reducing hospital's medical expenditure, patients' medical expenses and the risk of overspending medical insurance funds. Overall, it improves the accessibility of county

medical services and promotes healthy development.

Keywords: Medical treatment alliance; Stakeholder; Patient flow; Reforms in Healthcare

JEL: C83; I13; P36

Resumo

Contexto

Desde a reforma e abertura da China, a procura por serviços de saúde aumentou e os requisitos de serviços de saúde são maiores com o rápido desenvolvimento da sociedade e da economia. Com base na realidade de uma região da China, o novo modelo de gestão do sector da saúde - o Modelo de Combinação de Tratamento Médico - é definido e implementado. Este modelo integra os recursos médicos da região, reforma o método de pagamento do seguro médico, muda o funcionamento das instituições médicas com fins lucrativos e integra instituições médicas, médicos e pacientes, alcançando assim o objetivo de salvaguardar a saúde dos residentes da região.

Fonte dos dados e método de pesquisa

Fonte dos dados: Esta tese usou dados obtidos de entrevistas feitas aos *stakeholders*, estatísticas do departamento de saúde e departamento de segurança de saúde da região de DC, província de Henan (HN) na China; dados de relatórios anuais, relatórios estatísticos, dados internos do Ministério da Saúde e outras autoridades nacionais; documentos do Conselho de Estado, do Ministério da Saúde, da Administração da Segurança da saúde, e de outras autoridades relevantes da China.

Método de pesquisa: Através da análise do conteúdo das entrevistas, da análise estatística dos dados, o impacto do Modelo de Combinação de Tratamento Médico ou O Novo Modelo de Gestão que caracteriza "a integração de instituições médicas da região e municípios na gestão do grupo médico (MHG) + pagamento de pacote de seguro médico integrado (IBPMI)", ou seja, o modelo MHG + IBPMI (MHG + IBPMI) sobre as partes interessadas e o fluxo de pacientes na região é analisado, para sugerir políticas para a reforma médica regional da China.

Conclusão

A implementação do novo modo de gestão do sector da saúde numa região da China, ou seja, o Modo de Combinação de Tratamento Médico (MHG + IBPMI), altera a gestão hospitalar com objetivos de lucro e consegue um fluxo ordenado de pacientes, de modo a que os recursos médicos e o tratamento médico hierárquico sejam alcançados. A taxa de utilização de recursos médicos em centros de saúde municipais melhora e as despesas médicas do

hospital reduzem. As despesas médicas dos pacientes e o risco de gastos excessivos com fundos de seguro médico também se reduzem. No geral, o novo modelo melhora a acessibilidade aos serviços médicos na região.

Palavras-chave: Aliança de tratamento médico; Stakeholders; Fluxo de pacientes;; Reformas na saúde.

JEL: C83; I13; P36

摘要

研究背景与研究意义:

自中国改革开放以来,经济社会高速发展,人民群众对健康的需求大幅提高,对医疗卫生服务的要求也随之提高。结合当地实际情况,我国某县建立并实施了新型医疗运行管理模式——医疗共同体模式。该模式整合全县医疗资源,改革医疗保险支付方式,实现医疗机构管理营利性转变,统筹医疗机构、医生、患者的共同追求,从而保障全县居民的健康。

数据来源与研究方法:

数据来源: 论文中采用的数据来自利益相关者访谈、河南省郸城(DC)卫生部门和医疗保障部门统计数据;卫生部和其他国家当局的年度报告、统计报告与数据;国务院、卫生部、医疗保障局等有关部门的文件。

研究方法: 基于访谈内容分析和数据统计分析,本研究分析了医联体模式,也称医疗共同体模式(MHG+IBPMI),即“县乡医疗机构整合为医疗共同体运营(MHG)+医保整体打包支付(IBPMI)”的新型医疗运营模式,对县域利益相关者和患者流向的影响,旨在为我国区域医疗改革提供参考。

结论:

在中国一个县级区域建立并实施新型医疗运行管理模式,即医疗共同体模式(MHG+IBPMI),能有效转变医院原营利性经营方向,实现患者有序流动,从而实现医疗资源共享与分级诊疗。乡镇卫生院医疗资源的利用率从而得以提高,医院医疗支出、患者医疗费用以及医保资金超支风险得以降低。总体上,医疗共同体模式提高了县域医疗服务的可及性并促进其良性发展。

关键词: 医疗共同体; 利益相关者; 患者流向; 医疗改革

JEL: C83; I13; P36

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In the process of completing the doctoral research, the medical alliance model designed in this thesis has proved a success in my city and was promoted and replicated in Henan (HN) Province. However, I deeply feel that there is still a lack of knowledge, especially in management theory. Besides, medical and health industry is worth further research and

exploration, and I will continue to make efforts in the future.

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很高兴完成博士论文，并怀着无比激动的心情参加答辩。

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List of Acronyms

CPC: Communist Party of China

DC: Dancheng, the name of a county of China

HN: Henan, the name of a province of China

NPC: National People's Congress

PRC: People's Republic of China

ZK: Zhoukou, the name of a city of China

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Chapter 1: Introduction

At the Chinese county level and from the perspective of management science, this study explores the implication of the new joint medical operation model on stakeholders and patient flow, summarizes and analyzes the influence and interaction of the new joint medical operation model on stakeholders and patient flow, providing a theoretic guide for addressing problems arising from the operation of medical treatment combination and optimizing operation and management model. This study explores how to improve the current inefficient operation model of hospitals, address the contradiction between the shortage and the idleness of medical resources in county, and utilize medical resources in an efficient way, providing a reference for the medical reform in Henan (hereinafter referred to as HN) province and beyond.

1.1 Background of the medical care system in China

1.1.1 The development and problems of the medical care system in China

1.1.1.1 Achievements

The medical care system in China started from the establishment of the People's Republic of China (PRC) and its development can be divided into three major stages: the first stage is from 1949 to 1979, that is, the first thirty years since the establishment of PRC. This stage features the rapid growth of medical resources. The development of Chinese hospitals took place mainly after 1949. According to the statistics from National Health Commission of the People's Republic of China, there were only 2,600 hospitals and 30 sanatoriums nationwide when the People's Republic of China was founded. The number of hospitals at or above the county level increased by more than 1,500 by 1957 after development and construction. The second stage is between 1979 and 2009, the first thirty years since reform and opening-up. It was the first round of medical reform, also known as the policy adjustment period. The development of hospitals in China had gained momentum since 1980s. Compared with 1980, the number of hospitals and beds increased by 6,339 and 950,000 respectively in 1997, and the total number of hospital staff had an increase of 1.49 million in 1997. Medical equipment improved significantly with the rapid upgrading of large medical instruments and equipment.

Taking five types of equipment (X-ray machine, CT, ECT, color Doppler ultrasound, and kidney dialysis machine) as an example, in 1997, the coverage rates of the equipment in the hospitals under the Ministry of Health and in provincial hospitals were more than 80% and 50% respectively. The division of labor and the implementation of new business in hospitals gradually approached the level of modern hospitals. However, many problems still lay ahead such as the drop in the efficiency of hospital resource utilization, the biased allocation of resources in urban and rural hospitals, the rapid increase in medical expenses for patients, and the general decline in medical ethics. The third stage is from 2009 to the present. The Chinese government released the Opinions on Deepening the Health Care System Reform (CPC Central Committee & The State Council of the PRC, 2009), marking the beginning of a new round of reform in China. Therefore, the third stage of medical reform, is also called the new medical reform period (Cao, 2008).

The Chinese government attached great importance to the problems of lack of access to quality medical services, hospitalization and surgery caused by a serious shortage of health care resources. Since China's reform and opening up, the government has adopted policies to encourage multiple forms of medical services, resulting in significant improvement in terms of scale, conditions, level, and capabilities.

1.1.1.2 Existing problems

With the development of economy and society, huge change has also taken place in the medical section. In HN province, it is common to see that county-level hospitals are so crowded with patients that it is difficult to get a bed and medical service is almost inaccessible, while in the overstaffed township hospitals, few people come to seek medical service and the bed are in idle. According to statistics from the Health and Family Planning Commission of Zhoukou city (hereinafter referred to as ZK), HN province, China, in 2016, there were 13,387 staff in county-level hospitals and 13,741 workers in township hospitals in ZK. In terms of the number of people, it can be seen that the number of staff in township-level hospitals was slightly higher than that of county-level hospitals. However, the number of patients discharged from county-level hospitals was over 940,00, while the township-level hospitals was only 290,000, less than one-third of that in county-level hospitals. With regard to bed occupancy rate, the bed occupancy rate of county-level hospitals exceeded 100%; the actually used beds of almost all county-level hospitals were more than the approved number of beds; and the phenomenon of adding bed was common to see. On the contrary, the bed occupancy rate of township-level hospitals was less than 50%. According to the standard number of beds

of 5,620 in 2016, nearly 3,000 beds were in idle, which was equivalent to the number of beds in three county-level hospitals (Health Committee of ZK City, 2016).

1.1.2 Statue quo of China's medical and health care reform

As medical and health care undertakings have great impact on the national economy and the livelihood of people, medical reform is a matter of considerable public concern, and it is also a topic that the academic community has paid much attention to. China has carried out two rounds of medical and health care system reform, which are vividly called as the first round of medical reform and new medical reform respectively. The first round of medical reform began in the 20th century with the timeline from 1979 to 2008. It features the emphasis on the use of economic management methods in the operation of hospitals. In this way, the hospitals' poor management and accounting are expected to be improved and the efficiency of business operations is enhanced thanks to the increased initiative in business operation of medical institutions through economic means. This stage is called the "exploration" stage of medical reform. In 1985, Ministry of Health comprehensively conducted the activities of "advanced city in health care" throughout the country, marking the first round of medical reform. The government promulgated *Several Policy Limits Needed to Be Cleared in Conducting Healthcare Reform*, which achieved the linkage of different sectors and ensured the policy guarantee of the medical and health system.

The second round of reform began in 1996. The National Health Work Conference held in that year proposed the establishment of a comprehensive primary health care system covering all residents. And the central government issued the *Decision of the Central Committee of the Communist Party of China and the State Council Concerning Public Health Reform and Development* in 1997, proposing to establish a more complete health system by 2010. The second round of medical reform is called the new medical reform with the timeline from 2009 to the present. The second stage is mainly to correct the excessive marketization of the health care industry that emerged in the first round of reform, further strengthen the government responsibilities, complete the basic health system, emphasize the public-oriented nature of public hospitals, improve the accessibility and equity of medical and health care services, and ensure full coverage of basic medical and health services. The beginning of a new round of medical reform was marked by the promulgation of the *Opinions of the Central Committee of the Communist Party of China and the State Council on Deepening the Reform of Medicine and Health System* (hereinafter referred to as the *Opinions*) in 2009 (CPC Central Committee

& The State Council of the PRC, 2009).

Since the implementation of the new medical reform in China, great achievements have been made in the medical and health care undertakings, which attracted the world's attention. First, in terms of the medical insurance system, China has established the universal basic medical security system. Second, a national system for basic drugs has been established, and a new mechanism for grass-roots health service operation has been basically founded. Third, significant progress has been made in the reform of the grass-roots level medical and health service system. In the medical institutions at or below the county level, the full coverage of health centers and doctors has been basically achieved. Fourth, the public health services are gradually institutionalized and standardized, which promotes the shift of the health development model from disease treatment to comprehensive health management (National Health Commission of the PRC, 2013).

1.2 The operation model of medical treatment combination in China and its impact on patient flow

Medical treatment combination refers to a community of common interests and shared responsibilities, which is a collaborative alliance or an association of hospital groups by the integration of various professional hospitals in different levels in a certain area (Zhang & Wang, 2014). It first appeared in the early days of reform and opening up and is still being explored now.

1.2.1 The embryo stage (from the early 1980s to the early 1990s)

Since the early 1980s, the Chinese government has reorganized the health resources in the form of “medical collaboration consortium” in the medical and health care industry, which eased the problem of lack of access to medical service and hospitalization in urban hospitals to some extent. At that time, although the medical and health resources had been greatly developed compared with the founding of the People's Republic of China, they still failed to meet the growing medical needs of the people who generally expressed that it is difficult to see a doctor and to be hospitalized. Under this circumstance, Ministry of Health of took the initiative to carry out a series of reform measures to stimulate work motivation, including eliminating the practice of having everyone “eat from the same big pot” and encouraging medical development in various forms. Driven by the combined effect of a series of reform

policies, many regions over the country began to explore the reform of the health system and started to form a hospital complex (Song & Tan, 2007). In July 1984, led by Central Hospital Affiliated to Shenyang Medical College, the first medical collaboration consortium was established in China with eight staff hospitals and three health centers involved. By the end of 1984, 12 medical collaboration consortiums had been established in Shenyang city with 99 medical institutions involved, and the number of beds increased by 1,322 (Sun, 2007). After several years of development, the supply and demand structure of China's medical market has shifted from a gradual balance to oversupply. Accordingly, the relationship among the member hospitals of medical collaboration consortium changed from partners sharing benefits to competitors dividing the market, so the foundation of collaboration began to collapse (Song & Tan, 2007). In hindsight, the reform system had the obvious flaw of being heavily influenced by administrative decree at that time, which was the uncertainty factor hidden in the early stage of the construction of the consortium. This innate factor, coupled with objective development, led to the unsustainable development of the consortium. However, it can also be seen that some medical collaboration consortiums timely adjusted their strategies and actively adapted to meet the requirements of objective environmental development. They gradually developed into hospital groups and laid the foundation for the reorganization of medical institutions afterwards (Guo, 2005).

1.2.2 Initial formation stage of medical treatment combination (from the mid-to-late 1990s to 2012)

In the 1990s, under the influence of China's marketization and the medical and health policies of neighboring countries, medical chain institutions and medical groups emerged in China, facilitating the flow of limited health resources (Liu, 2013). At the same time, as the competition in the Chinese medical market gradually intensified, the CPC Central Committee and the State Council issued the Opinions on Deepening the Health Care System Reform to further promote the restructuring of resources in domestic public medical institutions. In 2009, Shanghai established a regionally-centered medical treatment combination by vertically integrating medical resources such as Grade-II and Grade-III hospitals and community health service centers (Ding, Dai, & Zhong, 2010). After 2011, the collaborative model of medical treatment combination, which features the leadership of Grade-III hospitals and the involvement of Grade-II hospitals and community health service centers, was taking shape (Wang et al., 2013). Anhui, Hubei, Shanxi, Beijing, Tianjin, Chongqing, Dalian and other

provinces and cities also begun to explore the construction of medical treatment combination (Hao & Liu, 2013).

1.2.3 Development stage of medical treatment combination (from 2013 to present)

At the National Health Service Meeting in early 2013, it was proposed that the medical treatment combination mechanism featuring interconnection between different levels was necessary to be explored and promoted. This was the first time the Ministry of Health had expressed the government's position on the development of medical treatment combination. The establishment of medical treatment combination, as an important step of medical and health reform, has become the focus of medical reform. In 2013, many cities in China began to explore the construction of medical treatment combination (Fang & Luo, 2013). These medical treatment combinations focus on clinical diagnosis and treatment, and all levels of medical treatment combination operate according to the primary mode of hierarchical medical system. The disadvantage is that there are fewer horizontal links among medical institutions at all levels outside the medical combination. According to statistics, as of June 2014, the Beijing Municipal Government has established 23 medical treatment combinations based on the regional level of its jurisdiction, involving 206 medical institutions and covering all residents in the jurisdiction (Beijing Municipal Committee of Chinese Peasants and Workers Democratic Party, 2015). In addition, some hospitals have recently made new attempts in joint operations, trying to explore new ways of joint medical operations, including specialist alliances, professional alliances, and medical alliances.

1.2.4 Impact of medical treatment combination model on patient flow

Through observation and research, it is found that patient flow is affected by many factors, among which the operation model of medical treatment combination has also many impacts on patients. Before the universalization of the medical insurance system, the patient flow in China was closely linked to medical resources allocation; before the implementation of the operation model of medical treatment combination, the patient flow was influenced by the medical insurance policy and resource allocation, among which resource allocation was still the main influencing factor. Through relevant statistics and surveys, the research finds that as the operation model among members of the medical treatment combination become more related, the place where patients choose to have initial diagnosis and receive recovery treatment tends to be grass-roots medical institutions, the use rate of beds in grass-roots

hospitals will increase significantly and the turnover rate of bed in county-level hospitals will also climb.

1.3 Characteristics of patient flow in county and township hospitals

1.3.1 The evolution of patient flow in China

Chinese people's habits of seeking medical service vary with the evolution of doctors' methods of practicing medicine. Before the establishment of hospitals in China, Chinese people, especially rural residents, generally looked for a nearby Langzhong (the doctor) for treatment when they were sick. If the patient is able to go to the place where Langzhong practicing medicine (medicine shop), he is accompanied by his family to seek medical treatment and get the medicine after diagnosis, or goes home to decoct and take medicine. If the patient is unable to go to the doctor's shop for medical treatment, the doctor is asked to go to the patient's home for treatment, and then the patient goes to the medicine shop or the place where Langzhong practicing medicine to get medicine. Even though hospitals are established in China, not everyone who is sick can get medical service in hospitals and only a small number of people can afford to go to the hospital. In 1952, the Chinese government established the policy of health work for workers, peasants and soldiers, proposing that prevention should be stressed, and that both Western medicine and Traditional Chinese Medicine (TCM) should be utilized. In the 1950s, China's public health staff and health care facilities were basically concentrated in cities, and there was a shortage of public health workers and medical facilities in rural areas. In 1955, Mao Zedong, President of China then, criticized the Ministry of Health for the situation. In the 1960s, less than half of the doctors were stationed in rural areas, making it difficult to serve the rural population, which at the time made up the bulk of the population.

In 1965, Mao Zedong put forward the guideline of taking rural areas as the focus in the famous "6·26" directive. After that, China began to pay more attention to rural health care. In particular, after the 1980s, the central government doubled its health budget in rural areas to 60%.

1.3.2 Characteristics of patient flow in county and township hospitals

With the development of economy and society, the medical sector is also undergoing tremendous changes. In HN province, it is common to see that county-level hospitals are so

crowded with patients that it is difficult to get a bed and medical service is almost inaccessible, while in the overstaffed township hospitals, few people come to seek medical service and the bed are in idle. According to statistics from the Health and Family Planning Commission of ZK city, in 2016, there were 13,387 staff in county-level hospitals and 13,741 workers in township hospitals in ZK. In terms of the number of people, it can be seen that the number of staff in township-level hospitals was slightly higher than that of county-level hospitals. However, the number of patients discharged from county-level hospitals was over 940,000, while the township-level hospitals was only 290,000, less than one-third of that in county-level hospitals. With regard to bed occupancy rate, the bed occupancy rate of county-level hospitals exceeded 100%, the actually used beds of almost all county-level hospitals were more than the approved number of beds, and the phenomenon of adding bed was common to see. On the contrary, the bed occupancy rate of township-level hospitals was less than 50%. According to the standard number of beds of 5,620 in 2016, nearly 3,000 beds were in idle, which was equivalent to the number of beds in three county-level hospitals.

1.4 Statue quo of medical care service in DC county

Dancheng (DC) county of ZK city is located at the eastern part of HN province, China, with an area of 1,490 square kilometers. It administers 23 townships (offices and high-tech industrial development zones) and 523 villages (communities) with a total population of 1.37 million, including 1.28 million agricultural population. 1.23 million people have joined the medical insurance scheme with the coverage rate of 99.8%. The average actual compensation rate for hospitalization charges in the county was 57.9%, and the compensation rate for the outpatient cost and outpatient service cost of general chronic disease was 74.2%, and the compensation rate for the outpatient service of poor patients with chronic diseases was 90%. According to *the DC County Health Statistics Yearbook*, by the end of 2017, the county had a total of 1070 medical and health care institutions at all levels, including 4 county-level hospitals, 20 township-level health centers, 3 community health service centers, 907 village clinics, 30 hospitals funded by social capital and 106 clinics. The county has 5,628 available beds and 3,048 professional and technical personnel, including 1,446 practicing (assistant) physicians and 1,602 registered nurses. In terms of their educational background, there were 225 people with bachelor degree or above, 707 attending college for professional training and 1487 under technical secondary school or below. In terms of their professional title, 24 people had senior title, 125 vice-senior title, 369 middle title, and 1988 primary title or below. There

were 4.2 beds per 1,000 permanent residents, 1.08 doctors per 1,000 practicing (assistant) physician, and 1.2 registered nurses per 1,000 permanent residents. The county's health system has a housing area of 285,370 square meters, of which 195,300 square meters is for business use. There are 12 large radiological medical equipment such as nuclear magnetic resonance and CT, and 130 equipment including CR (DR), color ultrasound, endoscopy and electrocardiogram (Health Committee of DC County, 2016).

1.5 Research dilemma

The research dilemma is mainly manifested in the following aspects: First, the disorderly flow of patients: patients choose higher-level hospitals because the township health centers cannot meet the treatment needs of patients, while county-level hospitals receive patients who originally belong to the treatment scope of the township health centers. The disorderly flow of patients is extremely inconsistent with the current general trend of graded diagnosis and treatment, thus causing a series of social problems. Second, the coexistence of the shortage of medical resources in county-level hospitals and the waste of idle medical resources in township health centers: patients are concentrated in county-level hospitals and above, making it hard to get medical services. As a result, patients who really need treatment from county-level hospitals generally find it difficult to seek medical services. On the surface, there seems to be a lack of medical resources, but in essence, patients who should have been admitted by township health centers occupy the medical resources of county-level hospitals. However, few people go to seek medical service in township health centers, which has led to a low utilization rate of the hospital beds and a waste of medical resources. Third, medical insurance funds may not make ends meet, facing a danger of collapse: the profit-seeking motive of medical institutions leads to excessive examination and over-medication; the disorderly flow of patients to higher-level hospitals increases the burden on patients and causes unnecessary expenditures of medical insurance funds; the above-mentioned situation has led to a year-on-year increase in the proportion of the expenditure of medical insurance funds. By 2017, it was directly unable to make ends meet. The current health insurance funds are supported by the previous balance, which are in danger of collapse without the improvement of the current situation.

Therefore, it is necessary to establish and implement a new operation and management model to adapt to the changes in the current environment of social and economic development, and this model will have an impact on the flow of stakeholders and patients in a region.

According to the actual situation of medical care, it took DC County 2 years (August 2016 to September 2018) to establish a new Medical Treatment Combination Model (MHG+IBPMI), namely, “integrating county and township medical institutions into medical and health group (MHG) + integrated bundled payment of medical insurance (IBPMI)”, which began the implementation in October 2018. It is unclear how the implementation of the new MHG model will affect stakeholders and the flow of patients.

1.6 Research objective and content

1.6.1 Research objective

Based on the stakeholder theory, this research analyzes the impact on the flow of stakeholders and patients after the implementation of a new Medical Treatment Combination Model in a county-level region in China.

1.6.2 Research content

To observe and analyze the impact on the flow of stakeholders and patients after the implementation of a new Medical Treatment Combination Model and the integration of medical resources of DC county: 1) the impact of the new model on the risk of overspending on medical insurance funds; 2) the impact of the new model on medical insurance department, health administration department, and financial department; 3) the impact of the new model on medical institutions, including county hospitals, township health centers, and private hospitals; 4) the impact of the new model on medical staff; 5) the impact of the new model on the flow, payment, and experience of patients; 6) the impact of the new model on the suppliers of medicines, consumables, and medical devices in medical institutions.

1.6.3 Research significance

The significance of this research is to analyze whether this new model can effectively alleviate the current dilemma of regional health care services and to explore new options for analyzing the methods of medical cost control, exploring the ways to build a hierarchical diagnosis and treatment system, understanding the driving factors of regulating medical behavior of medical institutions, and the approach of scientifically utilizing county medical resources, thus providing a reference for county-level health care reform in HN province and even nationwide.

1.7 Structure of the Thesis

This thesis consists of six chapters. Figure 1.1 shows the structure of this paper, including introduction, literature review, the medical care system and characteristics of patient flow in DC county, ZK city, HN province, method and data, results, and conclusions.

1.8 Summary

This chapter mainly discusses the background, dilemma, objective, content and significance of this research and the thesis structure. The research background involves the development and problems of China's medical and health care industry in the past 40 years, the current status quo of China's medical and health care reform, and the characteristics of medical treatment combination and patient flow.

The research dilemma is mainly the disorderly flow of patients, the coexistence of the shortage of medical resources in county-level hospitals and the waste of idle medical resources in township health centers, which in turn causes the risk that medical insurance funds will not make ends meet.

This chapter also proposes the purpose, content and significance of this research: to analyze the impact on the flow of stakeholders and patients after the implementation of a new joint medical operation model (Medical Treatment Combination Model) in a county-level region in China. The significance of this study is to provide reference for the establishment of county-level hierarchical diagnosis and treatment system and operation performance evaluation system of county-level medical treatment combination in the current process of China's medical and health care reform.

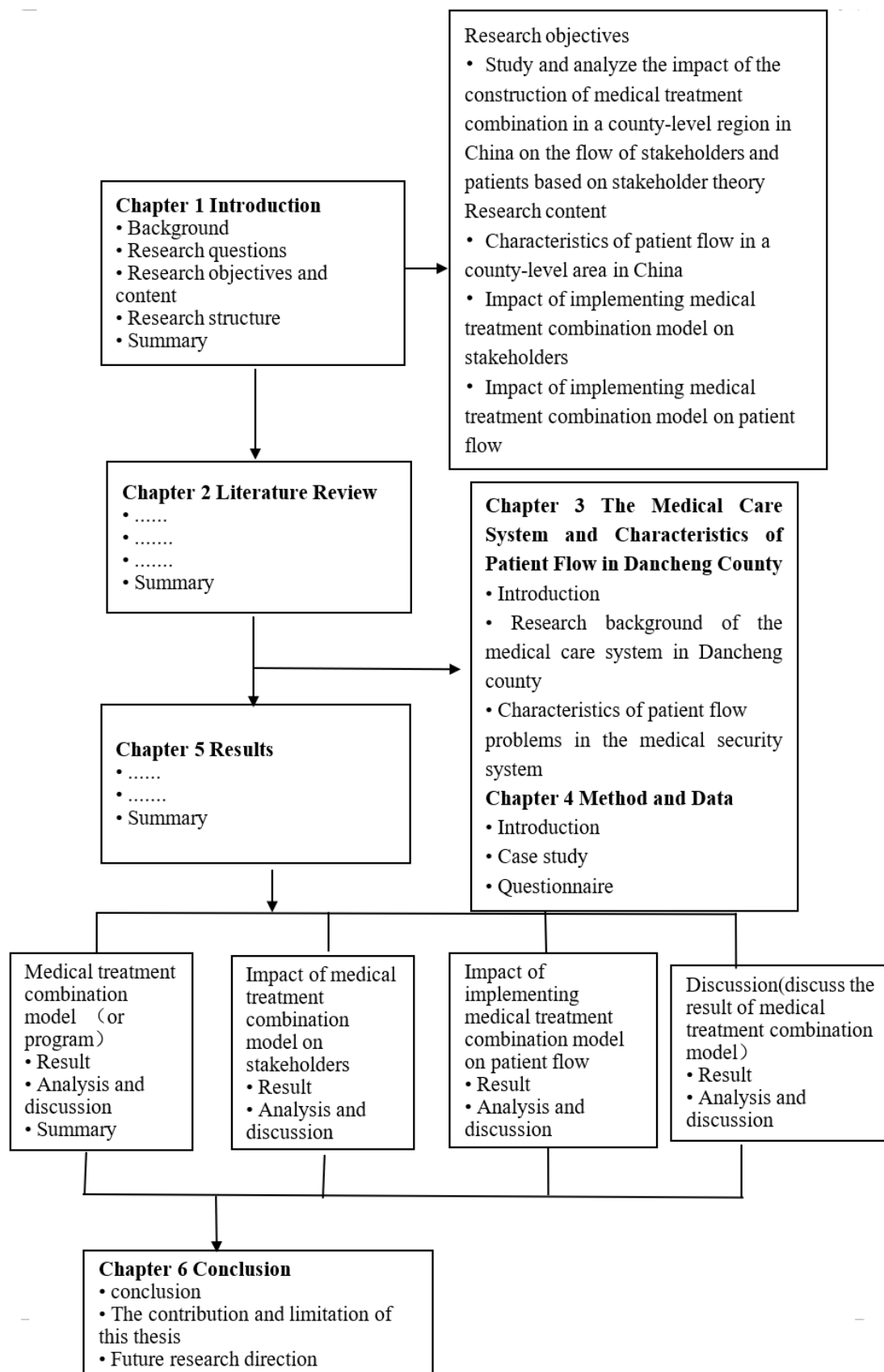


Figure 1.1 Structure of the thesis

Chapter 2: Literature Review

2.1 Introduction

This chapter mainly involves a literature review on theories related to this research from the two perspectives of theoretical framework and empirical research. From the perspective of theoretical framework, the stakeholder theory and the strategic alliance theory are taken into consideration. Especially, the researcher reviewed the stakeholder theory in hospital operation, the hospital organizational structure, the flow of patients and the strategic alliance theory in detail. Literature review of empirical studies cover those that are related to this research in and outside China.

2.2 Theoretical framework

Reviewing stakeholder theory, the basic concepts, research model, identification and classification, problems existing in the theoretical studies combined with patient flow were taken into account. The literature review may be divided into three levels, mainly including the stakeholder theory in hospital operation, hospital organizational structure and patient flow.

2.2.1 Stakeholder theory in hospital operation

2.2.1.1 Basic concepts

The term “stakeholders” first appeared in the internal document of Stanford Research Institute. Freeman (1984) defined the term as people who have a “bet” on an activity or investment in a company.. Stakeholders refer to any group or individual who can affect or is affected by the achievement of the organization’s behavior and objectives (Freeman, 1984). Based on this broad definition, almost any individuals and groups can be regarded as the enterprise stakeholders. Therefore, the definition of stakeholder was narrowed down to major and legitimate individuals and groups in the stakeholder theory (Freeman, 1984).

Freidman and Miles (2006) sorted out 55 definitions related to the problems of stakeholders in chronological order since the research was carried out by Stanford Research Institute in 1963. The definitions of stakeholders are summarized in Table A.1 in Annexes.

Among all definitions, the one defined by Stanford Research Institute is the earliest definition on stakeholder. The one defined by Freeman in 1984 is rather influential and is adopted by many studies. However, on the whole, scholars raised their definitions on stakeholders basically based on their own research, which leads to “no universal agreement on one definition” in the stakeholder theory (Donaldson & Dunfee, 1994).

Freeman (1984) also pointed out that any similar theory related to the decision-making power might be abused by non-shareholders because power is flowing from shareholders with more wealth to stakeholders with less wealth. The consequence of this is that the rights and interests of shareholders who benefit from corporate profits are likely to be compromised in the process of redistribution of wealth.

Companies are the place where most studies of stakeholder focus on. It was not until the end of the 20th Century that the research target was expanded. In summary, in the context of the healthcare field studied in this research, the researcher defines stakeholders as organizations, groups and individuals who can affect or is affected by the joint operation of the hospital.

Stakeholder theory was first used in the management of business enterprises. It was established on the basis of a strong questioning of the core concept of the traditional company owner that “the ownership of the shares of the company belonged to individuals and agencies”, namely it was developed on the basis of the “Shareholder Primacy Theory” (Wu et al., 2012). Stakeholder theory believed that stakeholders’ investment and management participation in an enterprise is the primary condition for the development of an enterprise. These stakeholders include shareholders, creditors, employees, consumers, suppliers and other people. Companies not only served for the interests of shareholder but also protected the interests of other stakeholders (Jin, Lu, & Li, 2013).

Blair and Whitehead from USA first introduced the Stakeholder Theory into the field of health at early times. Later, Dymond and other scholars have integrated the theory with other theoretical methods, expanding the field of theoretical application.

As an important research tool and method in the field of health, stakeholder theory has been widely used in related research in the medical and health field, especially when it comes to studying the behavior, role and influence of health organizations or individuals in the process of health policy making and implementation (Xu et al., 2015).

Medical service providers and patients are the two ends to integrate medical care. The failure of any party to follow the requirements will have an impact on the quality of integration service. Meanwhile, the differences in the policies of funds gained through

medical insurance, low stimulation of medical payment and single organizational integration cannot generate service coordination with high efficiency (Chen et al. 2016). Therefore, in the analysis of the policy measures of joint medical operation, it is imperative to carry out research on stakeholders of reform through stakeholder theory.

2.2.1.2 Research model of stakeholders

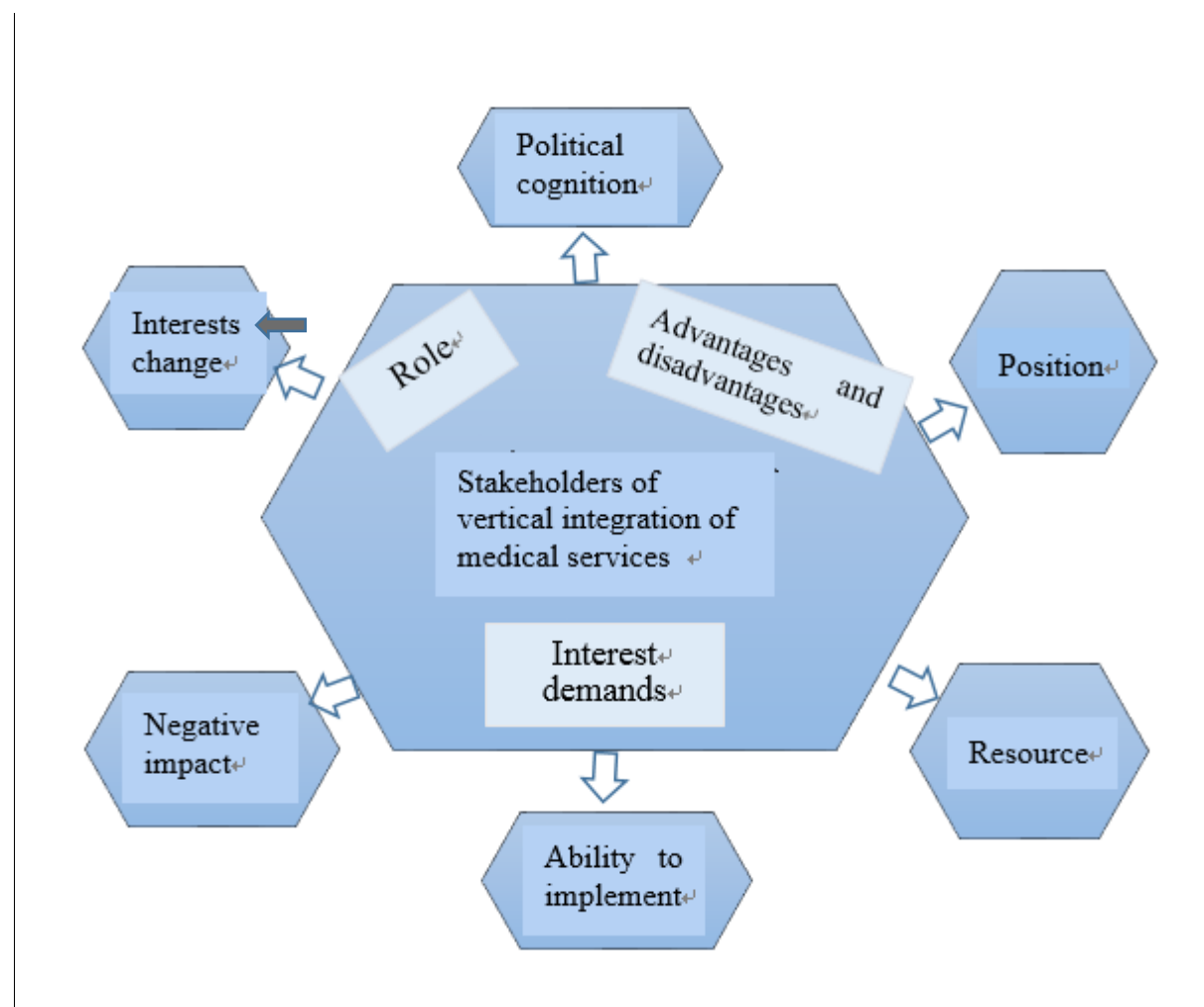


Figure 2.1 Research model of stakeholder

Source: Qian (2014)

2.2.1.3 Identification and classification of stakeholders

Previous research has been centering on the issue of identification and classification of stakeholders. Since the late 1980s, scholars have realized that it cannot meet actual needs to only define stakeholders of enterprises or organizations. Efforts are still needed to be made in the identification and classification of stakeholders. Due to different types of stakeholders and their different levels in affecting and being affected by enterprises, it is very beneficial for managers to implement different management strategies on different stakeholders based on the classified research of stakeholders from different angles.

Savage et al. (1991) classified stakeholders into four types, namely mixed blessing stakeholder, supportive stakeholder, non-supportive stakeholder and marginal stakeholder based on the potential of cooperation and threat. See Figure 2.2.

		Stakeholder's potential for threat to organizations	
		High	Low
Stakeholder's potential for cooperation with organization	High	Mixed Blessing	Supportive
	Low	Non supportive	Marginal

Figure 2.2 Classification figure of stakeholder raised by Savage et al.

Source: Savage et al. (1991)

Charkham (1992) divided stakeholders as contractual stakeholders and community stakeholders based on the different transaction contractual relationships between stakeholders with enterprises.

Clarkson (1995) divided stakeholders into primary stakeholders and secondary stakeholders based on their closeness to enterprises. The former refers to those who have a high degree of continuous participation and closeness, and directly affect the survival of the enterprise. The latter refers to the groups which do not transact with enterprises and have little impact on the survival of enterprises, or the groups that have an indirect and weak impact on business operations.

Freeman (1984) believed that stakeholders with different resources have different impacts on the enterprise. In his research, Freeman subdivided stakeholders into three categories: (1) people with company stocks, such as enterprise managers, employees and members of the Board of Directors. They are regarded as ownership stakeholders; (2) related groups in economic relations with the company, such as staff, creditors, consumers, suppliers, competitors, local communities and governing structures. They are considered to be economically reliant stakeholders of the company; (3) people enjoying social interests with the company, such as government entities, media and special groups. They are regarded as social stakeholders.

After analyzing the existing problems in the traditional performance evaluation system, Guo (2007) put forward the thought of marketing performance evaluation based on stakeholder relations. Feng (2010) studied the features and implications of enterprise

stakeholders and pointed out that stakeholders became a new research subject in theory and practice. His research defined stakeholders and analyzed the importance of stakeholder, concluding the identifiable, classifiable, heterogeneous, dynamic and contradictory features of stakeholders.

2.2.1.4 Ranking of stakeholders

It is generally difficult to treat all stakeholders equally, so they need to be ranked. The academic community is accustomed to sorting by “Multi-level” classification and Mitchell’s “Mithcheel Evaluation Method”. In terms of the research of international scholars, ranking and classification methods on stakeholders are represented by Freeman’s “Multi-level” classification and Mitchell’s “Mithcheel Evaluation Method”. In terms of multidimensional research, Wheeler and Sillanpa (1998) introduced the social dimension in defining stakeholder, therefore dividing stakeholders into primary social type, secondary social type, primary non-social type and secondary non-social type from the closeness dimension. Primary social stakeholders are those with two features, namely society-oriented and direct participation. Governments, social organizations and competitors form indirect relationships with enterprises through social activities are secondary social stakeholders. Primary non-social stakeholders are those who have direct impact on enterprises but do not exert influence on people. Secondary non-social stakeholders are those who do not have direct relations with enterprises (Wheeler & Sillanpa, 1998).

Based on the creatively combination of identification and classification of stakeholders, Mitchell proposed the Mitchell Evaluation Method, which is named after himself. This approach distinguished stakeholders from the three perspectives of the legitimacy, power and urgency, believing that all stakeholders of enterprises must consist of at least one of the three attributes. Stakeholders are divided into three types according to this method: (1) Definitive stakeholders. They possess legitimacy, power and urgency and they also enjoy primary concern of the company, including shareholders, employees and customers. They need to be in close contact. (2) Expectant stakeholders. They enjoy any two attributes of the three. (3) Latent stakeholders. They only possess one of the attributes among the three. Mitchell’s classification on stakeholder is shown in Figure 2.3.

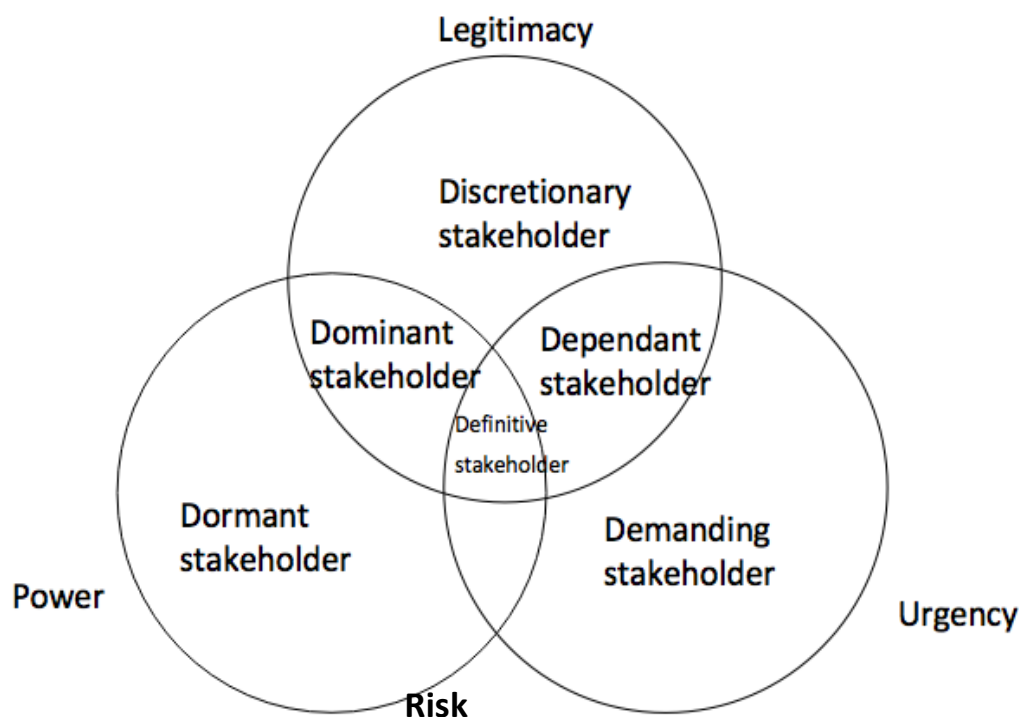


Figure 2.3 Stakeholder typology of Mitchell

Source: Mitchell, Agle, and Wood (1997)

2.2.1.5 Studies on stakeholder theory in the management of public hospital

Since the birth of the stakeholder theory, it gained a rapid development and formed a comprehensively complete theoretical system. The theoretical framework is composed of the concept, model building, the application on various social organizations and the promotive effect on the organizational development. As the theory became more mature, the viewpoints were gradually introduced to the hospital operation management after the 1990s (Zhao, 2014).

Blair and Whitehead in the United States were the first to apply stakeholder theory to health policy analysis and health institution management (Hu, Meng, & Hu, 2007). As the reform of Chinese public hospitals deepened, some public hospitals innovated hospital management and service concepts with remarkable results. Medical and health resources increased exponentially, and the medical process was safer and of higher quality. But in the process of reform, there exposed some problems, such as the excessive pursuit of marketization and weakening the feature of social welfare (Wu, 2008).

Analyzing the reform of public hospitals from the perspective of stakeholder theory must take into account the demands of various stakeholders in the daily operation and management process, so as to ensure the balanced development of the hospital. Moreover, identification and classification should be applied to stakeholders of public hospital to enable analysis and research as well as form scientific policies so as to improve operation management efficiency.

It is necessary to systematically collect and analyze stakeholder information, such as power, interests, knowledge, characteristics, and talents to develop scientific strategies, resolve resistance to reform, and improve policy feasibility when formulating health policies (Wang, Yang, & Huang, 2006).

He and Ma (2010) analyzed the interest groups in medical expense control. Pan et al. (2005) analyzed the related stakeholders of new rural cooperative medical system from the perspective of position to clarify the distribution of driving force and resistance of cooperative medical care. Gao (2009) analyzed the pharmacy custody system from the angles of three stakeholders, including hospital, pharmaceutical company and patients. Reviewing the policy background and implementation difficulty of the separation of drug prescribing and dispensing, Gao (2009) explored the rationality of the separation of drug prescribing and dispensing, analyzed the impact of pharmacy custody on relevant interest groups and finally put forward suggestions for scientifically implementing pharmacy custody. Qian, Zhou, and Lin (2010) analyzed all stakeholders in the two management lines of income and expenditure in the community service institutions. They classified three types of stakeholders namely primary stakeholder, secondary stakeholder and external stakeholder, so as to focus on and analyze several problems to be concerned in the implementation of policies (Qian, Zhou, & Lin, 2010).

A comprehensive review of the literature shows that past studies have focused on analyzing indicators such as the positions and roles of various stakeholders in health care reform. The realization of reform of hospital operation model must be done through cooperation of stakeholders. Different stakeholders have different motives, goals, methods and supportive degrees in participating hospital operation reform for their different resources. Hospital managers must fully consider and balance the needs of all stakeholders to enhance the motivation and initiative of stakeholders, as well as strive to achieve coordination and balance through policies to achieve a win-win situation acceptable to all parties. In this way, the goal of optimizing and improving hospital operations and management can be ultimately achieved.

2.2.1.6 Studies on stakeholder theory from the perspective of joint hospital management

Since the emergence of the definition of stakeholder, scholars outside China have done a lot of research on its concepts, definitions, and classifications. Friedman and Miles conducted the most in-depth research on the concept definition.

Freeman (1984) built a two-dimensional categorization matrix from the threat level and cooperation willingness on stakeholders from the perspective of enterprises. On this basis, he

put forward overall management strategy recommendations for four situations and pointed out different countermeasures for specific stakeholders under different management strategies.

According to Clarkson's theory, health administration departments, hospital management, medical staff, community health institutions, patients and other related institutions that participate in the vertical integration of medical services are the primary category; health insurance departments, disease control departments, and other related organizations indirectly involved are the secondary category (Clarkson, 1995).

On the basis of the aforementioned models, Eesley and Lenox (2006) studied the power given by stakeholders to the firm and believed that stakeholders exerted not absolute power but relative power on enterprises. In other words, the legitimacy and emergency of stakeholders' demand were more important than that of the stakeholders. Su, Mitchell, and Sirgy (2007) classified stakeholders into internal and external stakeholders from the perspective of their relations with enterprises. They believed that internal stakeholders were the core stakeholders while external stakeholders were divided into primary stakeholders and marginal stakeholders.

Xie et al. (2015) analyzed the integration mechanism of rural and county-level medical service based on the stakeholder theory and discovered that different integration policies have different results in reflecting the interest demands of stakeholders: regions with higher interests demands score witnessed higher cooperation willingness of stakeholder integration policy, therefore it can even influence the implementation effect of integration policy to a certain degree. After analyzing and studying the stakeholder groups, combining with the characteristics of each interest group, clarifying the interests, resources, resource utilization capabilities and positions of each group, Dong et al. (2018) discussed the role and application mechanism of various interest groups, and proposed measures to promote medical integration.

Jin, Lu, and Li (2013) believed that it is beneficial to build regional joint medical institutions for the development of the members of joint medical institutions, reduce the economic burden on the government as well as patients, and facilitate medical treatment. These should be guided and encouraged by the government at policy level to give full play to the role of joint medical institution in improving regional medical technical level and the reasonable allocation of medical resources. Qian (2014) took the reform pilot in Zhenjiang City as an example, analyzed the positions, policies, resources, abilities to influence implementation, and changes in interests of the stakeholders in vertical integration from the perspectives of playing roles, their own strengths and weaknesses, and differences in interest demands, and constructed a research model. The research concluded that differences in roles

and interests may cause conflicts and that poor coordination of differences in demands can affect the achievement of integration effects and create negative effects in integration. Based on this, a coordination suggestion was put forward in the study. System decision-makers should attach great importance to the coordination of the interests of all parties. Meanwhile, for groups with interest damages, measures should be taken to make up for the lost interest and build various methods combining economic and non-economic incentives to mobilize the positivity in a bid to transform the “non-supportive power” into “supportive power” (Qian, 2014).

Jia et al. (2018) analyzed the operation of specialized joint health institution by applying stakeholder theory. The researcher believed that systematic advantage is the good foundation for the building of joint health institution, but the lack of compensation and stimulation mechanism impeded its in-depth development. The lack of stakeholder balancing mechanism resulted in the different demands, leading to interest conflicts. It is proposed to strengthen cooperation among different departments at different level, build compensation stimulation mechanism to mobilize the positivity of all parties and balance interests of all sides (Jia et al., 2018). Yu, Gao, and Jiang (2012) studied the evaluation of satisfactory level of public hospitals from the perspective of stakeholder. They analyzed the impact of public hospital medical behavior on the satisfaction of all parties, and suggested how to improve satisfaction.

Hu and Meng (2006) analyzed the related factors of Chinese public hospital reform from three factors including government, system and stakeholders to discuss the conditions for building an efficient public hospital operation mechanism. They focused on the analysis of government characteristics, main external constraints and other factors, and proposed that reform was needed at all levels from all aspects in order to get a desirable effect. Huang, Feng, and Jiang (2011) analyzed the dynamic balance between public hospital and drug supplier based on the stakeholder theory, and concluded that the dynamic balance between the two parties was conducive to cutting transaction costs and reducing the high price of drugs. Xiang, Wang, and Zou (2012) analyzed the compensation mechanism of stakeholders and gaming theory and studied how to establish a feasible compensation mechanism for benefits under realistic conditions. They believed that following the principle of “compatibility in stimulation” can help the establishment of an interest compensation system for public hospitals, and that only by promoting the convergence of the pursuits of the government, hospitals and patients can the interests of all three parties be realized to the greatest extent, thus alleviating the conflicts among them. Zhu, Xia, and Zhou (2012) used stakeholder theory to analyze the factors influencing legal person governing structure of public hospital in terms

of driving force and obstacles, and put forward policy suggestions to remove the obstacles of stakeholder so as to advance the process of public hospital reform.

Based on the three aspects of stakeholders, strategic partners and hospital management, Zhang (2006) used theories such as stakeholder theory, stakeholder analysis and the law of strategic partners, which are often used in modern business management and strategic management, to analyze new environment, situations and problems in hospital management and to apply relevant concepts and ideas in hospital business management. Zhang proposed that managers needed to pay attention to continuously meet the needs of each group, maintain a dynamic balance among strategic partners, and achieve a rational win-win situation for all parties. Jia and Chen (2002) reviewed the development of stakeholder definition from scholars outside China and commented on the theoretical research results and application practices in the mid-1990s. Qian, Li, and Wu (2012) analyzed the guiding role of stakeholders from the perspective of performance management strategy of public hospital. Their research defined the core stakeholders of public hospital and analyzed the problems in the performance management of public hospital based on the stakeholder theory. Besides, they explored the implementation paths for improving performance management in public hospitals from three dimensions, including government, employee, and market.

2.2.1.7 Problems of the stakeholder theory research in the joint hospital operation

In terms of research limitations, most of the research in China focused on the theoretical level with fewer studies to hospital operations. In particular, there is a lack of research on stakeholder impact after the implementation of the joint operation model in public hospitals. Therefore, it is very meaningful to study the categorization and rank of stakeholders from the perspective of transformation of hospital operation model so as to balance the interests of stakeholders for hospital management departments and to improve the performance of hospital operation.

2.2.1.8 Summary

The above analysis shows that there is a lack of stakeholder research on hospital operation models. Past studies have been conducted to address the most common problems in hospital management. The research of performance management, satisfaction status, social responsibility and other issues of public hospitals from the perspective of stakeholders does not mention the ranking and classification of stakeholders related to hospital operation models in detail, and there is no clear description of the importance of stakeholders.

Because a large number of stakeholders are involved in the operation of enterprises, there are many and in-depth studies in this field, but there is no specific ranking and classification involved in the field of hospital operations. International academic research shows that scholars have conducted comprehensive and systematic discussions with stakeholders in terms of concept definition, classification, ranking, behavior, and management.

To sum up, there is still no research in importance ranking and classification of stakeholders in the reform of public hospitals' operating models. In the research, we may use experiences of other industries in China and related experiences of hospital stakeholders outside China, carry out ranking and classification research on relevant stakeholders according to their importance and influence, and put forward positive suggestions for hospital management and reform.

2.2.2 Hospital organizational structure and patient flow

2.2.2.1 Organizational structure of Chinese hospitals

China's county-level medicine and healthcare started after the founding of the People's Republic of China (hereafter referred to as PRC) in 1949. Since then, a primary healthcare system has been fully implemented in China's rural areas, and the rural health team and a cooperative medical system have covered counties and villages. By the middle 1960s, a three-level medical preventive and healthcare network with county healthcare centers as the core, township healthcare centers as the hub, and production group healthcare centers as the basis was initially formed in the vast rural areas. County healthcare centers were responsible for county's public health work and the administrative management of health in counties without a health department.

With the development of social economy and health, county-level healthcare service institutions have gradually refined the organization and division of labor. And the county healthcare centers have gradually evolved into several independent institutions such as county-level hospitals, maternity and child health care hospitals, and sanitation and anti-epidemic stations (Feng, 2005).

At the current stage, county-level medical and health institutions mainly include county hospitals, county traditional Chinese hospitals (ethnic medicine) hospitals, county-level disease prevention and control institutions, county-level healthcare law enforcement supervision institutions (Statistical Information Center of the Ministry of Health of the PRC, 2005).

China is a large agricultural country, and a major livelihood issue currently facing the Chinese government is to meet the growing medical and healthcare service demand of people. In *Plan and Implementation Plan for Deepening the Reform of the Medical and Health Care System during the 12th Five-Year Plan Period*, it is clearly stated that the new overall target of deepening the reform of the medical and healthcare system is to provide residents with secure, effective, convenient, and affordable medical and healthcare services (CPC Central Committee & The State Council of the PRC, 2012). The central government documents clearly stipulate the functional positioning of medical institutions at all levels, as well as emphasize the need to give full play to the functions of the grass-root three-level medical service network and to make full use of the role of the township hospitals. At the same time, great importance should be attached to the construction of village clinics for solving the patients' problems of high medical expenses and difficult medical treatment (Liu et al., 2009).

County-level people's hospitals undertake the task of guiding the development of rural medical technology, and have an indispensable position in the rural three-level medical service network. According to the investigation of development situation, the county-level people's hospitals can be classified into three types: the well-off type, subsistence type, and poverty type. Well-off type: most of these hospitals are in the developed areas, with 450 to 700 beds, 600 to 900 employees, and an average annual income of 80 million to 100 million yuan. The characteristics of such hospitals are as follows: most of these hospitals lack government subsidies or are not subsidized by the government. Meanwhile, they possess advanced personnel systems and distribution systems, advanced equipment and strong technical force. They are also closely connected with superior hospitals and supported by government complete policies. They are equipped with top software and hardware in the local areas, enjoying a faster development than other similar hospitals. Subsistence type: most of the county-level hospitals belong to this type, with 300 to 450 beds, 400 to 800 employees, and an average annual income of 30 to 50 million yuan. The characteristics of such hospitals are as follows: these hospitals are generally not very innovated and basically maintain the status quo with laggard operational performance. These hospital leaders generally have the mentality of seeking stability and being fearful of taking risks. Employees have small bonus gap. Poverty type: such hospitals are mostly in remote and poor regions with about 50% of the bed size of the subsistence type, 250 to 300 employees, and an average annual income of less than 20 million yuan. A few hospitals of this type have the most backward hardware facilities. In addition, such hospitals have other problems, for example, they have low level of medical technology and a small number of patients; staff salaries are not guaranteed to be paid

in full; managers have the mindset of “waiting, relying on, and requiring” so they lack the motivation and courage to reform; the deans of hospitals are frequently changed (Han, 2004).

In recent years, China’s Hainan Province, Shandong Province, and Zhejiang Province have chosen some regions to take the lead in exploring vertical cooperation between county-level and township medical institutions, and implementing pilot management reforms for the integration of county-township-village medical services, which have accumulated certain successful experiences with far-reaching social impacts. These management reforms optimize the integration of medical and health resources in the region, improve the efficiency of utilization, further improve and perfect the three-level medical services network, and gradually become the hallmark of the integrated management model (Chen, 2006).

2.2.2.2 Problems in China’s county hospitals

Through a study on the rational allocation of medical resources, Yu and Leng (2007) pointed out that China’s medical resources allocation is irrational because the economically developed eastern regions and cities occupy most of China’s health resources, and urban quality health resources are capitalized by a few large hospitals. However, in rural areas there is a shortage of doctors and medicines, and the cooperative medical system has almost collapsed. According to the statistics from National Health Commission of the People’s Republic of China, of the total national health expenditure in 1998, the government invested 58.72 billion yuan (around 8.39 billion US dollars) with 9.25 billion yuan (around 1.32 billion US dollars) spent on rural areas, only accounting for 15.9% of government investment. In that year, the urban and rural populations were 397 million and 866 million respectively, which is equivalent to 10 times more medical and health services per person in urban areas than in rural areas. There is a large gap in the equality of medical and health care between urban and rural areas, and farmers cannot find a doctor or buy the medicine they need.

At the same time, due to the concentration of high-quality medical resources in cities and the fact that China’s hierarchical diagnosis and treatment system has not been fully established, many patients with common diseases are flowing into city hospitals, and patients have been concentrated in city hospitals, which has led to the unreasonable structure of disease treatment in city hospitals. The city hospitals have admitted a large number of severely-ill patients that should have been to township healthcare centers, also making it difficult for patients to see a doctor and giving rise to the problem of “being hard to get the number ticket”; the increase in the number of patients in city hospitals has increased the workload of medical staff and the problem of “three long and one short” (long waiting time,

long check time, long time to pay money, short time to see a doctor) and the phenomenon of low patient satisfaction also pops up successively. Patients come to the city for medical treatment with the proportion of medical insurance payment decreasing, and personal transportation costs increasing, which results in an increase in patients' financial burden. The hospital is too busy with treating and dealing with common diseases, which has also adversely affected the hospital's discipline construction and sound development.

Because the primary medical service capacity is not high and the service quality is poor, it cannot meet the new demands of rural residents for medical care. As a result, many ordinary patients have flowed to urban hospitals, and the small number of beds and medical resources in township healthcare centers have been unoccupied. At the same time, the lack of patients also caused the flow of medical and technical personnel from township healthcare centers to urban hospitals, which lead to a worsening situation of the lack of medical staff at the primary level and a continuous decline in the capacity of primary services.

2.2.2.3 Basic concepts of patient flow

Patient flow has a narrow and broad sense. In a narrow sense, it refers to the sequence and order of patient visits in medical institutions; while in a broad sense, patient flow refers to the choice of a medical institution after a patient gets ill. The patient flow referred to in this thesis refers to the composition of a patient's choice of medical institution when seeking medical treatment.

In the context of the new round of medical reform, it is desirable to study the influence of the medical joint model on patient flow, seek a scientific and efficient medical joint model that can meet the requirements of medical norms, and improve the existing deficiencies and unscientific points in China to meet the patients' medical demand to a maximized degree.

From the perspective of the medical and healthcare institutions in China's counties, the differences in medical equipment and technical strength of hospitals at different levels are objective and necessary. However, how can we make use of the existing medical equipment and technologies in a scientific and reasonable way remains an issue concerned. We hope that health resources can be fully utilized and patients can receive effective diagnosis and treatment services in a timely manner. Therefore, the ideal patient flow is to let patients with intractable diseases go to higher-level hospitals, and patients with less serious diseases go to the neighboring township healthcare centers or village clinics for diagnosis and treatment . This can fully meet the medical requirements of the public and make full use of medical and healthcare resources to improve the overall quality and efficiency accordingly (Wu & Wang,

1991).

2.2.2.4 Patient flow model

During the research of patient flow model theory, it is found through literature search that most of the research on patient flow is confined to the optimization of patients' medical treatment procedures in hospitals, and there was less literature on the patient flow' choice of medical institutions. Most scholars pay attention to influencing factors on patients' choice of hospitals, and believe that among the factors that affect patients' choice of medical treatment, medical technology is the main factor, followed by hospital charges, transportation convenience, medical conditions and service attitude of medical staff (Chen et al., 2012). There is almost no research on the influence of the joint operation mode of medical institutions on the patient flow, and there is not any definition of it. Therefore, this study simply defines the patient flow model based on the current patients' choice of medical institutions.

The random type of patients flows, patients simply choose medical institutions for treatment based on their own judgments and needs and their knowledge of medical institutions, instead of the necessary diagnosis by primary doctors and hospitals. They may choose a primary medical institution, or directly choose a superior or even a third-grade hospital.

The ordered type of patients flows, patients follow the relevant procedures according to doctor's advice, medical conditions, support level of medical insurance policy, and referral regulations.

The scientific type of patients flows, patients can make a scientific and reasonable choice of medical institutions within the framework of the system designed by the relevant government agencies and according to relevant procedures, doctors' recommendations, their own ability to pay and the support level of medical insurance.

2.2.2.5 Theoretical analysis of patient flow

A review of the literature shows that previous studies on patient flow mainly focused on the technical level of hospitals, medical prices and patients' ability to pay. After medical institutions at all levels uniformly implementing the charging standards set by the price department, many patients with minor injuries and illnesses who could have been treated in primary hospitals still continue to flow to large hospitals. Therefore, it is not comprehensive to explain the flow of patients from a certain aspect. The thesis mainly aims to carry out an

analysis of five aspects: faith in seeking medical treatment, medical service capacity, patients' ability to pay, medical insurance policy, and disease condition factors.

Referring to cognitive theory, Chinese scholars Wu and Wang (1991) believed that medical seeking faith plays a decisive role in patients' medical seeking behavior. The relationship between medical faith and medical behavior is expressed by the formula: $B = F(X)$. Where B is the behavior of seeking medical treatment, X is the faith in seeking medical treatment, and B is a function of X. This formula can be used as a theoretical model for analyzing medical treatment behaviors.

In the research of medical service capacity and patient flow, some studies have concluded that the major causes of patient loss are backward medical facilities and the medical technology that cannot meet the needs (Jin & Song, 2014). In recent years, compared with institutions above the county level, the development of rural medical service institutions has been relatively lagging, and the overall level gap has been further widened. This will lead to more patients choosing to go to the county and upper-level hospitals for medical treatment; in turn, this situation will further widen the imbalance and gap in the development of urban and rural medical institutions (Qu et al., 2006). At the same time, the disease spectrum of Chinese residents has changed greatly in recent years, and the main cause of residents' death has been changed from acute infectious diseases to chronic diseases, which has been gradually deepening.

A study on the flow of medical treatment for chronic disease patients by Qian et al. (2007) showed that the ability of rural chronic disease patients to pay is increasing, and if the service mode and service capacity of township healthcare centers cannot be improved quickly, the number of patients going to township healthcare centers will further decrease as the ability of patients to pay and their demand for higher-level care increase.

Insufficient types of essential medicines at the grassroots level also make patients hesitate to visit to the primary hospitals. Since the national essential medicine system was popularized, all primary medical and health institutions at and below the county level have used national essential medicine and implemented zero margin sales. However, because county-level and township medical institutions are equipped with different types of essential medicines, the medicines of primary medical institutions cannot meet the higher needs of patients, which is not conducive to the development of specialties in township healthcare centers. In addition, the low-priced medicines in the essential medicines list are often not supplied in time, especially in some medical and health institutions with small demand for medicines and relatively remote locations. Moreover, winning bidders often entrust other pharmaceutical

companies in the county to assist in the distribution due to consideration of cost. For the increased distribution process, the original limited profits are divided by the pharmaceutical enterprises that assist in distribution, so the enthusiasm for the successful bidders and participating distribution enterprises are affected, causing the frequent shortage of low-price drugs. Furthermore, this phenomenon will also affect the patient flow to seek medical treatment in primary medical institutions (Dong, 2014).

Taking the research on the flow and expenses of inpatients at county-level and above medical institutions in Guizhou Province as an example, significant changes occurred between 2012 and 2014, with inpatient expenses, reimbursement expenses and out-of-pocket expenses of medical institutions within the county being lower than those at medical institutions outside the county. The inpatients of new cooperative medical services tend to flow to medical institutions outside the county, showcasing an increasing trend of patients' demand for high-quality medical services (Jin, Zhang, & Song, 2017).

After studying the number of visits and beds, the number of patients and the per capita medical expenses of outpatients at various levels of medical institutions between 2012 and 2014 in *China Health Statistics Yearbook* (National Health Commission of the PRC, 2014b) and *China Health and Family Planning Statistics Yearbook* (National Health Commission of the PRC, 2014a), Chang and Tian (2016) comprehensively analyzed the influence of these indicators on the outpatient flow of various medical and healthcare institutions. The results are shown below. Outpatient visits in third-grade hospitals has increased significantly from 2005 to 2013, from 397,144,845 in 2005 to 1,238,219,000 visits in 2013; the proportion of total hospital visits rises from 28.64% to 45.16%. Since 2012, the proportion of outpatient visits in third-grade hospitals has accounted for more than that in second-grade hospitals. The proportion of outpatient clinics in township hospitals as a percentage of the total number of hospital visits has shown a downward trend, of which the proportion fell from 22.73% in 2006 to 11.95% in 2007. The proportion of outpatient visits and treatments in the first-grade hospitals is the lowest, and the change trend is relatively stable. From 2005 to 2013, most outpatients went to the second-and third-grade hospitals and from 2005 to 2012, most outpatients flowed to the second-grade hospitals. After 2012, many outpatients began to flow to the third-grade hospitals. Most patients flow to second-grade and third-grade hospitals, mainly due to the expansion of second-grade and third-grade hospitals and the improvement of medical technology. An analysis shows that the number of hospital beds increased from 2,445,012 to 4,578,601, with an average annual growth rate of more than 6%. The number of beds in primary medical and health institutions increased from 725,827 to 1,349,908, with an

annual increase of 5.5%. And the growth rate of hospitals was higher than that of primary medical and health institutions (Chang & Tian, 2016). Gu and Xu (2015) believed that attracting patients to return must be achieved by the following measures: improving the level of diagnosis and treatment of medical institutions, establishing the concept of service capability as the core competitiveness, improving service capabilities, increasing the business volume of medical institutions, and promoting the healthy development of medical institutions with a virtuous development cycle.

Research on patients' ability to pay and patient flow: Chang and Tian (2016) analyzed per capita medical expenses of outpatients at various levels of medical institutions between 2012 and 2014 in *China Health Statistics Yearbook* and *China Health and Family Planning Statistics Yearbook*. The results showed below: the per capita medical expenses of outpatients in the hospital rose from 99.63 yuan (around 14.23 US dollars) in 2002 to 206.4 yuan (around 29.48 US dollars) in 2013, which is generally on the rise. The higher the hospital level, the faster the growth. The charge gap has been gradually widened. Moreover, the medical cost becomes higher when the hospital level is higher. Community health service centers and township hospitals have a more gradual change. Among them, the township hospitals have the lowest cost.

Based on the analysis of cross-sectional survey data in Gansu Province, the current utilization of medical services by rural residents has polarized. Poor residential patients can take no treatment or self-treatment, while patients with good economic conditions choose to receive the medical treatment in county-level and above hospitals. Therefore, in the case that patients seek medical treatment at their own expense, more patients may select to be treated in a medical institution at or above the county level as long as their economic conditions permit (Qian et al., 2007).

At present, China's basic medical insurance policies determine that reimbursement ratios vary at different levels of hospital, but there are few policies to stimulate the two-way referrals. As long as the reimbursement ratio factor is not considered, patients can freely choose hospitals for treatment. Although this is convenient for patients, patients often tend to choose a general hospital for medical treatment due to the asymmetry of medical information between doctors and patients, which causes the medical resources of the large hospital to be strained and leads to the waste of primary medical resources. In addition, there are fewer community healthcare services currently included in the scope of medical insurance, and there is an objective shortage in quantity and type of drugs in community hospitals compared with general hospitals. In the increasing diagnosis and treatment of chronic diseases and geriatric

diseases, family beds and many special rehabilitation programs urgently needed by patients are difficult to be carried out (Li, 2014). In the past, the new rural cooperative management department tried to use the economic leverage of the reimbursement ratio to formulate a scientific and reasonable compensation mechanism and establish a hierarchical diagnosis and treatment and two-way referral system, thus guiding patients to scientifically choose a medical institution (Jia et al., 2016).

After studying disease condition factors and patient flow, Wu and Wang (1991) believed that disease condition factors can influence patient flow. Although patients' faiths about the harmfulness of the disease condition are affected by their own education, work and living conditions, in general, patients believe that the more harmful their disease is, the more likely they are to seek medical treatment, and the higher the level of seeking medical treatment, the higher the expectation for medical services.

2.2.2.6 Summary

Patient flow is a direct revelation of the effect of medical and healthcare resource allocation and it is also the guiding result of medical and healthcare policies. Experts in China and other countries have studied it and it is closely related to the faith in seeking medical care, medical service capacity, patient's ability to pay, medical insurance policies, disease conditions and other factors and is also affected by the above-mentioned factors. The disease condition will not be shaken as the basic factor for the patient to seek medical treatment; patients' faith in seeking medical treatment often have a decisive influence on patient flow: the closeness of the faith in seeking medical treatment to the actual condition is directly proportional to the appropriateness of the medical seeking behavior. Therefore, promoting patients' faith closer to the objective situation can achieve the purpose of regulating patient flow (Wu & Wang, 1991). Patient flow is related to the demand for capacity in medical services. With the economic and social development and the improvement of patient's ability to pay, the influencing factors of service capacity will be more conspicuous. Medical insurance policy factors have different influence on patients with different ability to pay and the general rule is that the stronger the ability to pay, the smaller the impact; the weaker the ability to pay, the greater the impact.

2.3 Empirical research

2.3.1 Empirical research beyond China's mainland

Through the analysis of related research outside China, it shows that the integration of

medical service system has always been the development direction of the whole medical and health field, and it is more or less reflected in all countries and regions around the world. Of course, different places take different approaches for integration according to their own actual conditions. At present, the main models of foreign medical hospital health alliances are concluded as follows:

(1) The strategic alliance model: it is a loose medical hospital health alliance model represented by the Taiwan region. It refers to the strategic combination, with a characteristic of a positive correlation between the strength of member cooperation and the dominant power of the alliance. In the alliance, its members are free to enter and exit. The alliance does not have the highest decision-making body with real power, so the alliance's behavior is not mandatory. Participating members are independent and retain the right to operate their own business, and are not bound by the alliance in terms of finances (Xiang, Jiang, & Zhang, 2016).

(2) The service level network model: it divides the medical health alliances into three or two levels according to the regional medical demand level. To maximize the benefits of various resources, medical institutions at different levels have their own priorities and their functions are clearly defined. The community healthcare service center provides basic daily healthcare services such as medical care and social care; the second-grade hospital mainly provides treatment services for patients with major accidents or emergency patients, and the third-grade hospital provides treatment services for patients with serious and difficult diseases. The community is the first threshold for healthcare, and patients in the community have to gradually refer to their superiors through the primary medical network. This model is practiced in the United States, Japan and the United Kingdom in various forms. Japan has established the "outpatient, inpatient, and a low frequency and highly specialized three medical circle"; the United Kingdom has established a "community medical service, a regional hospital, and teaching hospital three-grade network"; in order to optimize resources, American hospitals adopt the model of alliance with primary medical institutions. Health maintenance organizations combine the functions of insurers and medical service providers. Specifically, common diseases are treated by primary care doctors, and major difficult diseases are referred to corresponding specialist doctors in accordance with patients' conditions. This method is an effective way to improve the inefficiency of medical care. Currently, the United States is also actively promoting medical health alliances, hoping to achieve the medical reform goals of improving medical quality, reducing unnecessary examination and treatment, saving and controlling medical costs, and optimizing allocation of

resources (Zhang et al., 2014).

(3) The regional medical center model: this is the model adopted in Australia. It is similar in form to the service level network model, but has different connotations. The original structure and functions of each participating member of this model are maintained, and the regional entity medical center is an independent legal person (Xiang, Jiang, & Zhang, 2016).

(4) The entrusted management model: it hosts and supervises other medical institutions by the high-level hospitals, the company's internal management or the core hospitals. The ownership of the trusteeship unit remains unchanged and the management right is handed over to the entrusted party. During the trusteeship period, the trusteeship unit maintains the original unit nature and property rights. Entrusted management forms include private institution custody, internal management custody, and corporate custody; Japanese government mainly adopts private agency custody and internal management custody, while Singapore and the United States use corporate custody (Xiang, Jiang, & Zhang, 2016).

(5) The group alliance model: it is represented by the two major hospital groups in Singapore. This model is mixed vertically and horizontally. There may be hospitals of the same level or hospitals of different levels in the group, and they use the two-way referral system. The purpose to coordinate the management and allocation of health resources within the group is achieved by establishing a board of directors. The model's operating mechanism mainly adopt the director-in-charge system under the leadership of the board of directors. The group headquarters manage finance, medical affairs, information systems, quality, education, logistics; the board of directors can participate in the formulation of hospital development strategies, monitor the quality of health services, and approve important personnel changes and financial affairs (Xiang, Jiang, & Zhang, 2016).

(6) the joint merger hospital group model: it is the further integration of ownership based on the group hospital health alliance, forming a hospital group with independent legal person status and uniform management of resources, which is still part of the government and implements corporate management. In addition, the board of directors established by the hospital group is the highest decision-making body, responsible for formulating the overall development strategy of the hospital and supervising its implementation. It is represented by the merger of ten public hospitals in Berlin, Germany, and the trust of the British hospital. The model of ten hospitals in Berlin is organized according to the company's organizational structure. First, a board of directors is formed, half of which is composed of government-nominated employer representatives, and the other half is composed of employee-nominated employee representatives. Second, a group management mechanism is

adopted, and a CEO is appointed by the board. Hospital trusts in the United Kingdom are managed by an independent board that can determine the composition of the hospital's management. The hospital director is appointed by public bidding (Tao & Wu, 2015).

2.3.2 Empirical research in China's mainland

2.3.2.1 Origin and development of medical hospital health alliance

In 2013, the National Health Commission explicitly encouraged the construction of medical hospital health alliance at the National Health Work Conference, and issued policies to provide support for its construction. However, there is no consensus on the definition of a medical hospital health alliance at present in the industry.

Nowadays, the following definitions are widely accepted:

The medical hospital health alliance, known as a regional medical hospital health alliance, referred to as hospital health alliance for short. It mainly refers to the management and operation methods of large and medium-sized hospitals as well as primary medical and health institutions in the same area or under a relatively unified management system through optimization and integration. Through the implementation of group operation, a unified management service model is formed, and the functions of preventive healthcare, health services and medical treatment of the original institutions undertaken by each are integrated. Integration objects include the level, nature, management system, affiliation of different types of institutions.

In general, Chinese scholars' definitions of medical hospital health alliance mainly focus on two categories. Most of them tend to agree with the model of vertical integration of medical resources. They believe that medical health alliance refers to the formation of a medical collaboration in a certain area through the association of various types of hospitals, so as to achieve the optimal allocation of medical resources and the sharing of resources among the members of the consortium, thus achieving the purpose of improving the overall service level of medical institutions. In this relevant definitions, scholars have mainly emphasized the composition of medical hospital health alliance (medical institutions of different types, levels and functions), and mainly highlighted the characteristics of vertical integration (Jin, Lu, & Li, 2013). Another group of scholars does not regard the vertical or horizontal integration of medical resources as characteristics when defining the medical hospital health alliance, but summarized "horizontal" and "vertical" as the construction method. This group of scholars believes that the medical hospital health alliance is led by the medical institutions, combining

several medical institutions and community healthcare service institutions in a certain area, forming the community of interests through some forms of resources integration, and optimizing allocation of medical resources through benefit sharing (Lin & Chen, 2014). Although this definition does not explicitly mention types and levels, it still expresses the construction of a medical hospital health alliance and the integration of high- and low-level medical institutions.

In general, Chinese scholars have roughly the same definition of the medical hospital health alliance, mainly emphasizing the characteristics of its vertical integration of medical resources. The vertical integration model seems to be more in line with the current characteristics, so it is widely recognized.

In this study, the medical hospital health alliance is defined in this way. It refers to the vertical integration of medical resources between the upper and lower levels within a certain area, specifically taking high-level hospitals as the leader and uniting some or all of the lower-level medical and health institutions. And it uses technical collaboration and joint operation as a means to form a relatively loose or tight medical information sharing and responsibility and benefit sharing organization system to achieve complementary advantages, resource sharing, and efficient operation. And the county-level medical hospital health alliance refers to the integration of medical and health resources at the county, township and village levels by taking the county hospital as the leader and the township healthcare centers as the link between the upper and lower levels of medical institutions, thus realizing the rational optimization of the division of labor within the alliance to form an organic and unified community of interest, and the rational allocation of medical resources through the reform of the operation model. The main purposes of organizing the construction of county-level medical hospital health alliance are promoting the improvement of medical treatment level through upward and downward linkage within the alliance, guiding patients to choose medical institutions scientifically and reasonably with resource allocation and services, establishing an effective service chain for hierarchical diagnosis and treatment and medical expense control, innovating the original management and operation model, and reforming the government's macro-guidance and regulation strategy on the division of labor and cooperation among medical institutions.

In the early 1980s, the “medical collaboration hospital health alliance” began to gradually emerge and develop in China's medical and healthcare industry, which was inseparable from the government's reorganization of health resources. It alleviated the difficulty of seeing a doctor and hospitalization in urban hospitals to a certain extent. However, the development of

medical and health resources was still difficult to meet the growing medical needs of the people, and the difficulty of seeing a doctor and hospitalization generally reflected by the people was not really solved. Under this circumstance, the government issued a series of reform measures to break the old system of “big pot rice”, encourage multiple forms of medical treatment. arouse the enthusiasm and increase the total amount of medical resources. Driven by the government’s reform policies, attempts were made to explore the development of hospital health alliance. In July 1984, Shenyang Central Hospital took the lead and established the first medical collaboration hospital health alliance in Chinese history (Sun, 2007).

After the 1990s, China’s market economy was gradually established. At the same time, influenced by the advanced experience of neighboring countries such as Singapore and South Korea, new types of medical organizations such as medical chain institutions and medical groups began to appear in China. The emergence of these organizations and groups promoted the flow of health resources (Liu, 2013). In the mid-to-late 1990s, the government issued the Opinions on Deepening the Reform of the Medical and Health System to promote a new round of restructuring of medical resources as competition in the Chinese medical market gradually intensified. Nanjing Gulou Hospital Group, established in December 1996, started the construction of medical hospital health alliance in China. In 2009, Shanghai vertically integrated the medical resources of third-grade and second-grade hospitals and community healthcare service centers within its jurisdiction to establish regional medical hospital health alliance, which improved the medical technology level and service capabilities of grass-roots medical personnel and enhanced the efficiency of medical resources utilization (Ding, Dai, & Zhong, 2010). After 2011, a wave of the construction of medical hospital health alliances popped up across China. Various collaborative models of medical hospital health alliance led by higher-level hospitals with the participation of lower-level hospitals and primary medical institutions emerged (Wang et al., 2013). Several provinces (municipalities) such as Anhui, Hubei, Shanxi, Beijing, Tianjin, Chongqing, Dalian have also explored the construction of medical hospital health alliances (Hao & Liu, 2013).

In early 2013, the National Health Commission proposed to encourage the development of medical hospital health alliances, and emphasized that patients should be able to achieve satisfactory medical services nearby. It stated that the construction of medical hospital health alliances was an important way. Since then, construction of the alliance has become a focus of medical reform. In the same year, a comprehensive attempt was made nationwide to build medical hospital health alliances based on clinical collaboration and exploring the hierarchical

diagnosis and treatment path (Fang & Lou, 2013). These medical hospital health alliances usually focused on clinical diagnosis and treatment, and medical institutions at all levels tried to explore a “graded diagnosis and treatment” model. However, the disadvantage was that there were fewer links among medical institutions at all levels. According to statistics, as of June 2014, a total of 23 medical hospital health alliances were established in Beijing according to regional levels, integrating more than two hundred medical institutions and serving all residents in the jurisdiction (Beijing Municipal Committee of Chinese Peasants and Workers Democratic Party, 2015).

2.3.2.2 Operating model of medical hospital health alliance

Sun et al. (2015) divided medical hospital health alliances into two models in accordance with the rights, responsibilities and interests of core hospitals and primary medical institutions: (1) Compact type: a relatively complete integration with assets as a link. Generally, core hospitals have primary institutions ownership or financial management rights; (2) Loose type: a business technology cooperation-based model without involving asset integration. Zhang et al. (2017) believed that there were roughly three main modes of practice in China’s medical hospital health alliances: one is a compact medical hospital health alliance characterized by asset integration; the second is a semi-compact medical hospital health alliance with trusteeship model implemented by the core hospital to its member units; and the third is loose medical hospital health alliance characterized by technical cooperation.

Some scholars believe that China’s medical hospital health alliance originates in the early days of reform and opening up in the 1980s, and is still in the trial and development stage. The main models are: (1) Ruijin-Luwan medical hospital health alliance model: this model is a medical hospital health alliance set up in Shanghai to increase the number of beds, shorten the outpatient waiting time and utilize the idle resources of small hospitals Led by Ruijin Hospital, it unites the two second-grade medical institutions (Luwan Branch of Ruijin Hospital and Southeast Hospital) in the joint area, and four community medical institutions with each structure member as an independent legal entity. In terms of governance structure, a director responsibility system is adopted under the leadership of the board of directors (Yu et al., 2015). (2) Medical hospital health alliance model of Zhenjiang Rehabilitation Medical Group: this model takes Zhenjiang First People’s Hospital as the leader, includes five second-class hospitals and 10 community health service institutions within its jurisdiction, and integrates the resources of clinical tests, imaging, community healthcare management, disinfection and supply, procurement and supply, and information to form six centers, which

has realized purposes of resource integration and utilization,, two-way referral of patients, and hierarchical diagnosis and treatment (Cheng, Liu, & Wang, 2015). (3) Nanjing Gulou Hospital Model: it is a more special model characterized by capital, technology, management and cultural output to help the development. Nanjing Gulou Hospital took a 10% stake in the restructuring of Suqian People's Hospital to assist its development with the hope to enhance the hospital's comprehensive medical service capabilities and levels. Therefore, some scholars have defined this kind of assisting model of Nanjing Gulou Hospital as "medical hospital health alliance" (Cheng, Liu, & Wang, 2015).

In 1984, Shenyang City established a medical cooperative hospital health alliance characterized by voluntary mutual benefit and horizontal technological and economic alliances. Some literature call it the "lower-level medical hospital health alliances" in the early China, and it "lays a foundation for breaking the old pattern of fragmented divisions and closed hospitals". However, the disadvantage of this model is that the connection is relatively loose with limited horizontal joints, and that the mechanism of division of labor and cooperation is not clear. Therefore, it cannot be called a "regional medical hospital health alliance" in the true sense due to a gap between it and a real one (Liu, 2015).

In 2009, under the new round of medical reform policies, the Chinese government vigorously encouraged various regions to deepen their medical reforms and explore the construction of regional medical hospital health alliances by means of financial support; in 2011, Shanghai launched two pilot medical hospital health alliances: Ruijin-Luwan, Xinhua-Chongming, which ushered in a new chapter for China's medical reform innovation system (Yu et al., 2015).

Shandong Province, as a pioneer, explored the integrated county-township management model. Nearly three-quarters of its regions joined the regional medical cooperation with the proportion of stable cooperation institutions exceeding 60%. Most hospitals realized the unification and sharing of information network management systems. Based on the regional characteristics and local technological advantages, Hubei Province explored different forms of regional medical hospital health alliance models that are in line with the actual situation of the region. Luoyang, HN Province established medical hospital health alliances covering more than 120 medical and health institutions (Dong & Hao, 2015). National pilot provinces such as Anhui and Fujian for comprehensive medical reform explored and established medical hospital health alliances with their own characteristics (Zeng et al., 2016). In summary, China's medical hospital health alliance is still in the exploratory stage, and it will mainly carry out technical cooperation in a loose type (Lu, 2013).

2.3.2.3 Summary

The development of the Chinese Medical hospital health alliances is based on learning from international experience. With the deepening of medical reform, medical institutions have progressively abandoned the model of fighting alone. Instead, the joint operation between institutions is the general trend and it has gradually become a common tendency. The joint form has shifted from being loose to compact in recent years. Through joint operations, medical institutions can accomplish resource sharing, improve operational effectiveness and efficiency, promote the rational allocation of medical resources, and then guide the appropriate patient flow to realize the reasonable and effective utilization of medical resources.

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Chapter 3: The Characteristics of Medical Care System And Patient Flow in DC County, HN Province

3.1 Introduction

This chapter is structured into three parts: first, an introduction to the medical security system of DC County in terms of its regional characteristics and current situations; second, an analysis of the characteristics of patient flow within DC County and its cause; third, a summary of the existing problems faced by the medical care system of DC County.

3.2 The medical security system of DC County

3.2.1 Regional Characteristics

DC County is located at the junction of the eastern part of HN province and Anhui province. The county borders Huaiyang County, Luyi County, and Shenqiu County to the west, north and south respectively, with Bozhou City and Taihe County of Anhui province in the east and southeast. It is affiliated to ZK City, with an area of 1490 square meters under administration. The following two figures are the maps of HN province and ZK city.



Figure 3.1 The map of HN province, China



Figure 3.2 The map of ZK city, HN province, China

DC County is located at the East HN Plains, south of the Yellow River alluvial fan. From 35.6m to 43.8m above sea level, it inclines from northwest to southeast, with a gradient of

1/7000. The terrain is flat, and the plain area accounts for 100%. By the end of 2007, all administrative villages have been covered with asphalt road. The longest distance between DC County and ZK city is more than 90 kilometers, and the shortest distance is about 55 kilometers.

DC County governs 23 towns (sub-district offices) and 523 villages (communities), with a total population of 1.37 million, including 1.28 million rural people.

In 2017, DC County's GDP reached 24.54 billion yuan. Per capital disposal income of urban and rural residents was 24,030 yuan and 10,290 yuan respectively, ranking sixth in the city. Therefore, it is a state poverty-stricken county (People's Government of DC County, 2018b).

3.2.2 The characteristics of the medical care system

By the end of 2018, as for the status quo of medical care system of DC County, there were 1070 medical and health institutions in DC County, including 4 county-level (Level II) hospitals with 2506 beds, 20 township health centers and 3 community health service centers with 1475 beds, 907 village clinics, 30 hospitals funded by social capital with 1672 beds and 106 clinics. The number of actually used beds reached 6820. The county's health system had a housing area of 285,370 square meters, of which 195,300 square meters was for business use. There were 12 large radiological medical equipment such as nuclear magnetic resonance and CT, and 130 pieces of equipment, including CR (DR), color ultrasound, endoscopy and electrocardiogram (Health Committee of DC County, 2018). The composition of medical and health resources in DC County were shown in following Figure 3.3 and Figure 3.4

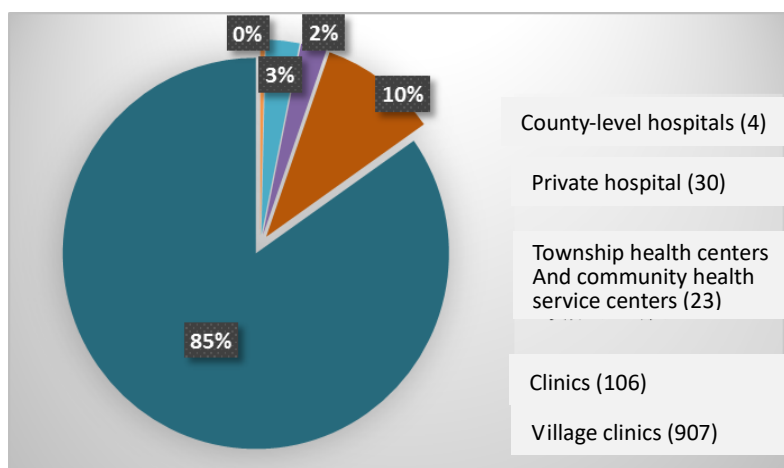


Figure 3.3 The composition of medical institutions of DC County

Source: Health Committee of DC County (2018)

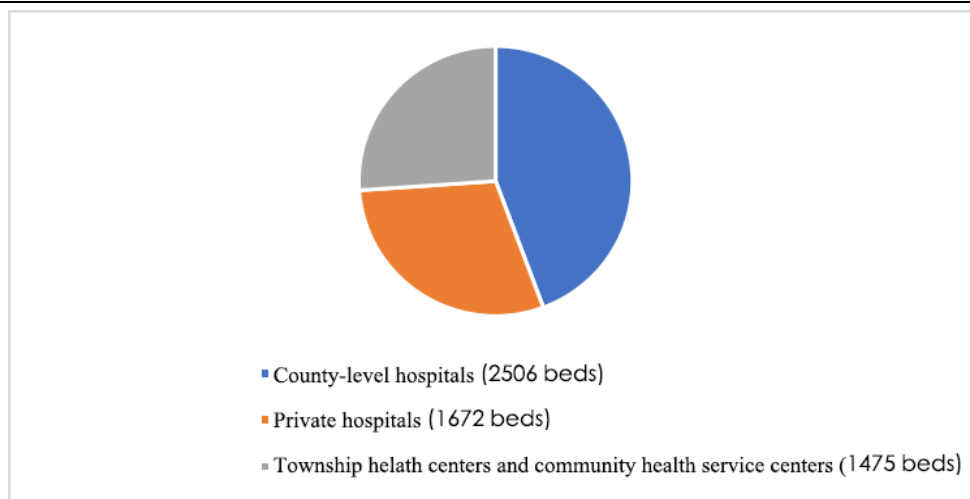


Figure 3.4 The distribution of beds in medical institutions of DC County

Source: Health Committee of DC County, 2018

In DC County, there were 3,048 professional and technical personnel, including 1,446 practicing (assistant) physicians with entry-level professional title, among which 768 are in county-level hospitals and 364 in township health centers (community health care centers); there were 1602 registered nurses. In terms of their educational background, there were 225 people with bachelor degree or above, 707 with junior college degree and 1487 graduated from secondary technical school or below. In terms of their professional title, 37 people had senior title, all from county-level hospitals; 179 people had vice-senior title, with 155 in county-level hospitals and 24 in township health centers (community health care centers); 415 people had middle title, with 323 in county-level hospitals and 92 in township health centers (community health care centers); 567 people had entry-level professional title, with 345 in county-level hospitals and 222 in township health centers (community health care centers). There were 4.2 beds per 1,000 permanent residents, 1.08 doctors per 1,000 practicing (assistant) physician, and 1.2 registered nurses per 1,000 permanent residents on average (data source: DC County Health Statistics Website). The composition and distribution of medical staff were shown in Figure 3.5 and Figure 3.6.

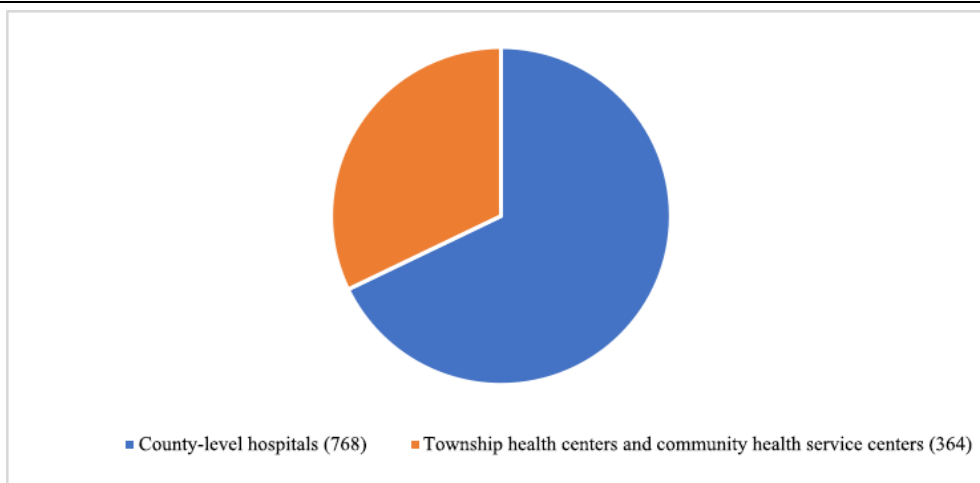


Figure 3.5 The composition of professional and technical personnel

Source: Health Committee of DC County (2018)

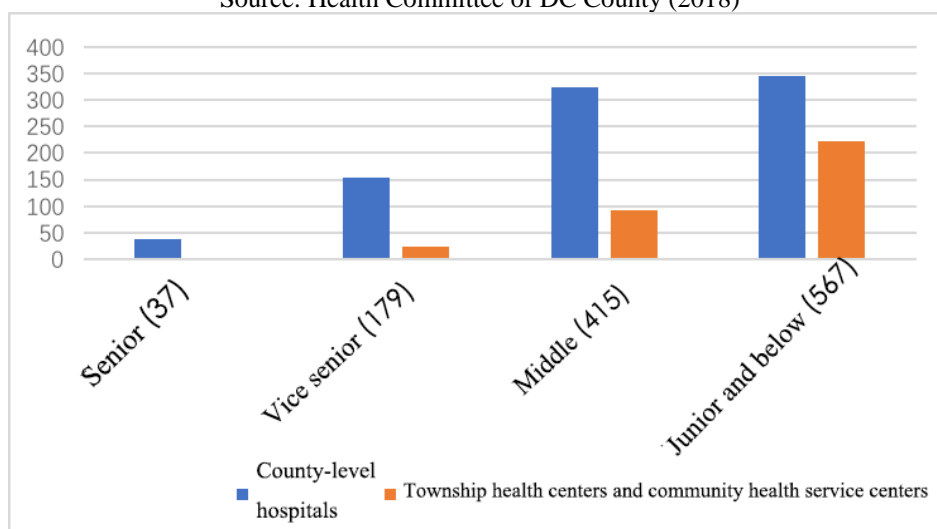


Figure 3.6 The composition of professional titles of medical staff

Source: Health Committee of DC County (2018)

The revenue of hospitals in China mainly includes financial assistance from Bureau of Finance, financial assistance from higher authority and operating revenue. In 2011, the average revenue of each hospital was 169.16 million yuan, the financial assistance from Bureau of Finance was 13.13 million yuan, the financial assistance from higher authority was 0.35 million yuan, and the operating income was 155.68 million yuan, including the medical service revenue of 85.19 million yuan, the drug selling revenue of 68.17 million yuan and other revenues of 2.31 million yuan. In total revenue, the proportion of financial assistance from Bureau of Finance was 8%, the proportion of financial assistance from higher authority was less than 1%, and the proportion of operating revenue was around 92%, with revenues from medical services, drug selling and other sources accounting for 50%, 20% and 2% respectively. It can be seen that medical services and drug selling are main sources of hospital revenue, accounting for 50% and 40%. Meanwhile, the proportion of financial assistance

from Bureau of Finance was relatively low at 8%, which indicated a low level of financial support in hospital revenue around China (National Health Commission of the PRC, 2012).

The data used in this study were extracted from the financial statistics of DC County People’s Hospital to show the financial sources of medical institutions in DC County. The data showed: In 2008, hospital revenue was 500.86 million yuan and financial assistance was 5.03 million yuan (including: 840,000 yuan for retirees’ payment, 400,000 for general practitioner training, 200,000 yuan for TCM discipline constructions, 3 million yuan, 550,000 yuan for AIDS prevention and control and 40,000 yuan for other uses). In addition, the government has granted bed allowances with 3,500-5,000 yuan for each bed. However, in DC County, this fund was not in place. In terms of hospital infrastructure construction, in the state construction projects, supporting funds from local governments is always not in the place (People’s Hospital of DC County, 2018). The revenue structure of DC County People’s Hospital in 2018 is shown in Figure 3.7.

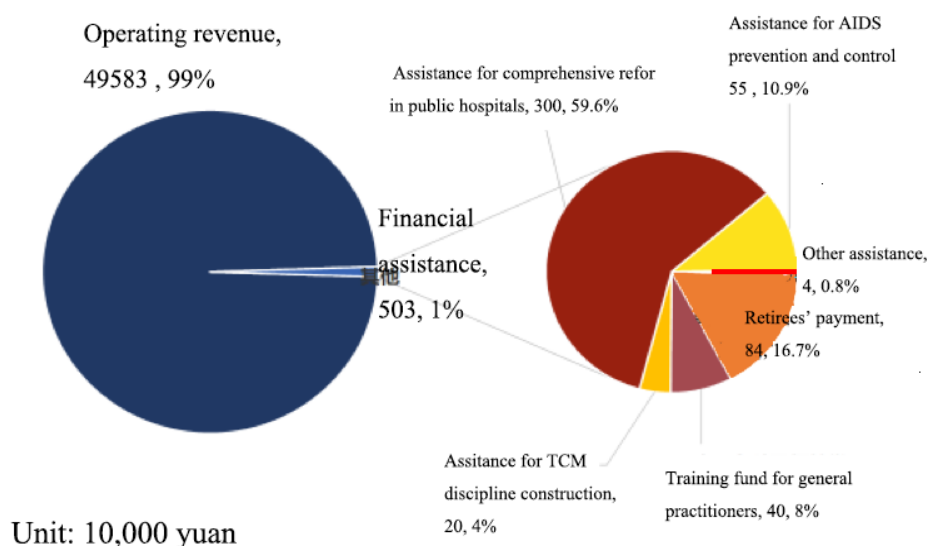


Figure 3.7 The revenue structure of DC County People’s Hospital in 2018

Source: People’s Hospital of DC County (2018)

In 2017, 1.23 million people have participated in the medical insurance schemes, with a coverage rate of 99.8%. The county’s average actual reimbursement rate for hospitalization expenses was 57.9%, the outpatient reimbursement rate for common chronic diseases was 74.2%, and the outpatient reimbursement rate for chronic diseases among the poor was 90% (Health Committee of DC County, 2020).

The launch of *Implementation Measures of Basic Medical Insurance for Urban and Rural Residents* (People’s Government of HN Province, 2016a) in November 2016 marked the

establishment of a medical insurance system for all in DC County that achieved full coverage. Individual payment and government subsidy was combined. Meanwhile, in terms of individual payment, government shall provide subsidies for people who are eligible to living allowances, the extremely poor support people, people with disabilities, the elderly (over 60 years old) and minors from low-income family and the entitled group. In recent years, the funding level of basic medical insurance in DC County has witnessed steady progress. In 2019, the individual payment for basic medical insurance was 220 yuan (150 yuan for full-time students of colleges and secondary schools) per person, government subsidies was raised to 490 yuan per person. Thus, average insurance fund per person reached 710 yuan. The maximum reimbursement for hospitalization was 150,000 yuan annually (People's Government of HN Province, 2016a).

Table 3.1 The deductible line and reimbursement rate of hospitalization for insured residents in 2017

Hospital Level	Deductible Line	Reimbursement Rate
Township: Township health centers (community health service centers)	200yuan	200—800 yuan 70%, over 800 yuan 90%
County: Level II hospitals and below	400yuan	400—1500 yuan 63%, over 1500 yuan 83%
City: Level II hospitals and below	500 yuan	500—3000 yuan 55%, over 3000 yuan 75%
City: Level III hospitals	900 yuan	900—4000 yuan 53%, over 4000 yuan 72%
Provincial: Level II hospitals and below	600 yuan	600—4000 yuan 53%, over 4000 yuan 72%
Provincial: Level III hospitals	1500 yuan	1500—7000 yuan 50%, over 7000yuan 68%
Outside the province	1500 yuan	1500—7000 yuan 50%, over 7000 yuan 68%

Source: People's Government of HN Province (2016a)

On December 24th, 2016, the general office of HN provincial government issued *Notice on the Issuance of Measures for the Implementation of Serious Illness Insurance for Urban and Rural Residents (For Trial Implementation)* (People's Government of HN Province, 2016b), moving forward to cover the huge expenses incurred by serious illnesses, which is regarded as an extension of the basic medical insurance system. The relevant payment standards are shown in Table 3.2

Table 3.2 Payment standards of serious illness insurance for urban and rural residents in 2017

The part beyond what individuals should bear	Reimbursement standard
15,000-50,000	50%
50,000-100,000	60%
100,000- (400,000 is the limit)	70%

Source: People's Government of HN Province (2016b)

On the same day, HN provincial government issued the *Opinions on the Implementation of Serious Illness Supplementary Medical Insurance for the Impoverished People (For Trial Implementation)* further covering the huge medical expenses incurred by serious illnesses for people living in poverty based on basic medical insurance and serious illness compensation insurance system for urban and rural residents (People's Government of HN Province, 2016c). In 2017, funds will be raised at an annual per capita rate of 60 yuan. Provinces, provincial cities, counties (cities, districts) shall bear the financial burden in the proportion of 30%, 30% and 40%. Reimbursement standards are shown in Table 3.3.

Table 3.3 Payment standards of supplementary medical insurance for critical illnesses of people in difficulties in 2017

The part beyond what individuals should bear	Reimbursement standard
3000-5000	30%
5001-10000	40%
10001-15000	50%
15001-50000	80%
50001-	90%

Source: People's Government of HN Province (2016c)

3.3 The characteristics of patient flow

3.3.1 Patient flows

Patients are free to select medical treatments. According to the DC County Health Information Statistics Annual Report, in 2018, the number of outpatients in DC County's hospitals and health centers was 1.792 million, of which 969,200 were in county-level hospitals, 602,200 in township health centers, and 222,500 in private hospitals, accounting for 53.93%, 33.51% and 12.56% respectively. In 2018, the number of patients discharged from hospitals in the county

was 165,200, of which 89,300 were from county-level hospitals, 38,800 from township health centers, and 37,100 from private hospitals, accounting for 54.06%, 23.47%, and 22.47% respectively. The out-of-county treatment rates accounted for 13.34%. As for referral, only 62 patients from township health centers were referred to county-level hospitals, and 368 from county-level hospitals to township health centers (Health Committee of DC County, 2018).

3.3.2 Township health centers patient flows

DC County Medical and Health Statistics Report showed that in 2018, 66.37% of beds in township health centers in DC County had been used, which had showed a significant upward trend from 55.82% in 2017. The data also shows that 33.63% of beds used in township health centers did not change between 2017 and 2018. Based on 23 health centers and community health service centers in the county, about 385 beds are used per day, which is equivalent to the number of beds in a county-level hospital. In terms of outpatients, in 2018, hospitals and health centers in DC County had treated 1,842,300 outpatients, of which 633,200 were treated in township health centers, accounting for only 34.37%. The above statistics show that medical resources in township health centers are not being properly used due to poor planning of patient flow (Health Committee of DC County, 2018).

3.3.3 Patients flow in county-level hospitals

According to DC County Medical and Health Statistics Report, in 2018, the rate of beds used in public hospitals in DC County was 103.44%, which had significantly increased from 96.75% in 2017. In terms of the number of outpatients, in 2018, hospitals and health centers in DC County had treated 1,842,300 patients, of which 973,100 were in county-level hospitals, accounting for 52.82%, an increase of 0.42% from 52.40% in 2017, with the same scale of doctors, nurses and medical services at county-level hospitals. The above statistics show that county-level hospitals are facing the increasing risk of medical insecurity due to the increasing patients (Health Committee of DC County, 2018).

3.4 Problems in the healthcare system

3.4.1 Investment in medical care

From 1995 to 2010, the total expenditure of health care in China reached 1,998.39 billion yuan, accounting for 4.98% of the GDP. The year-to-year increase of government's

expenditures on the number and proportion of health care shows that the government's emphasis on and support for health care services is increasing year by year. Compared with developed countries such as the United States and Japan, however, the absolute amount and relative ratio of health care investment are still relatively low. Residents' medical expenditures account for a relatively high proportion of total health care expenditures, and the burden is relatively heavy. Financial support for health care facilities remains low (National Health Commission of the PRC, 2010).

3.4.2 Distribution of medical resources and level of medical services

Various types of medical and health institutions with different levels provide medical services to different groups, with different and clear service functions, covering people from all levels of the city to rural areas, and meeting various demands for medical services. However, due to the relatively uneven distribution of medical resources including medical personnel and medical facilities, most of the high-quality resources are concentrated in hospitals, especially Level-III hospitals, which results in the relatively low quantity and quality of medical resources in grass-roots medical institutions and hospitals in lower level. Therefore, the level of medical services provided is still relatively low.

3.4.3 Total medical resources and resource allocation

Statistics have shown that the total amount of various medical resources owned by health care institutions has continued to rise, including the number of various types of medical personnel, beds and other health service facilities. The absolute number of medical resources and the total number of medical services have continued to increase, but the large imbalance of resource allocation still exists not only between different types of medical institutions, such as hospitals and grass-roots medical institutions, but also between different levels of the same institution type, such as between Level-II and Level-III hospitals and primary hospitals (health centers). There is still a big gap in the quantity and proportion allocation of various resources such as medical personnel and beds. Hospitals, especially Level-II and Level-III hospitals, occupy a large proportion of medical personnel, beds, and other resources. The use of medical resources is also extremely uneven. For example, the use of beds in Level-III hospitals is overloaded, but primary hospitals (such as township health centers and community health service centers) concurrently are partly relatively idle.

3.4.4 Coverage of the medical security system

At present, China's medical security system includes three programs: basic medical insurance, medical assistance, and supplementary medical security system, which protect different groups respectively.

After the latest reform, basic medical insurance system, which is composed of medical insurance for employees as well as medical insurance for urban and rural residents, covers the urban employed population, as well as urban and rural residents respectively. The medical assistance system is known as a break-even system at multiple levels in China, aiming to provide people in need with help regarding joining basic medical insurance and provide subsidies for out-of-pocket expenditures that they cannot afford personally. Commercial health insurance except what we have mentioned above and other forms of supplementary medical insurance are included in supplementary medical security system, whose purpose is mainly to meet the demand of higher-level medical treatments beyond basic medical insurance. The current medical security system has basically covered various groups in society.

It is undoubted that the basic medical insurance system plays the leading role of the medical security system, with over 252 million urban employees and 221 million urban residents joined at the end of 2011, and 832 million citizens joined the new rural cooperative medical system, totally covering 1.305 billion Chinese citizens, according to data in *China Health Statistics Yearbook* (National Health Commission of the PRC, 2012). The coverage rate of national medical insurance has reached over 90%.

The data of the *China Health Statistics Yearbook 2012* reveals that the total national health expenditure in 2010 was 1998.39 billion yuan, including 573.249 billion government health expenditure, 719.661 billion social health expenditure, and 705.129 billion personal health expenditure. In the composition of total health expenditure, the proportions of expenditure borne by government, society and individuals are 28.7%, 36% and 35.3%, respectively (National Health Commission of the PRC, 2012). In China, the proportion of expenditure paid by individuals is as high as 35.3%, which is much higher than the average level of other countries in the world. For example, this proportion in the U.S. was 18% in 2009, and only 28.7% in Japan in 2010.

We should note that within the medical security system, the proportion of medical expenditure paid by patients themselves in the China's total national health expenditure is still relatively higher than in developed countries such as the United States and Japan. The highest

level of per capita medical insurance is also still relatively low. Private medical insurance, which plays a significant role in reducing personal medical expenditure, is still relatively underdeveloped in China.

3.4.5 Medical insurance payment uncertainty and individual expenditure burdens

After analyzing of the monitoring indicators of DC County in 2015-2018, including the total funding of medical insurance, the total payment of medical insurance, and the total payment of medical insurance within and outside the county as shown in Figure 3.8, we found that medical insurance payment risk is extremely severe and on the verge of collapse. Particularly in 2017, the medical insurance funding even failed to cover expenditure. Although a series of measures were adopted at all levels, the situation in 2018 was still not optimistic.

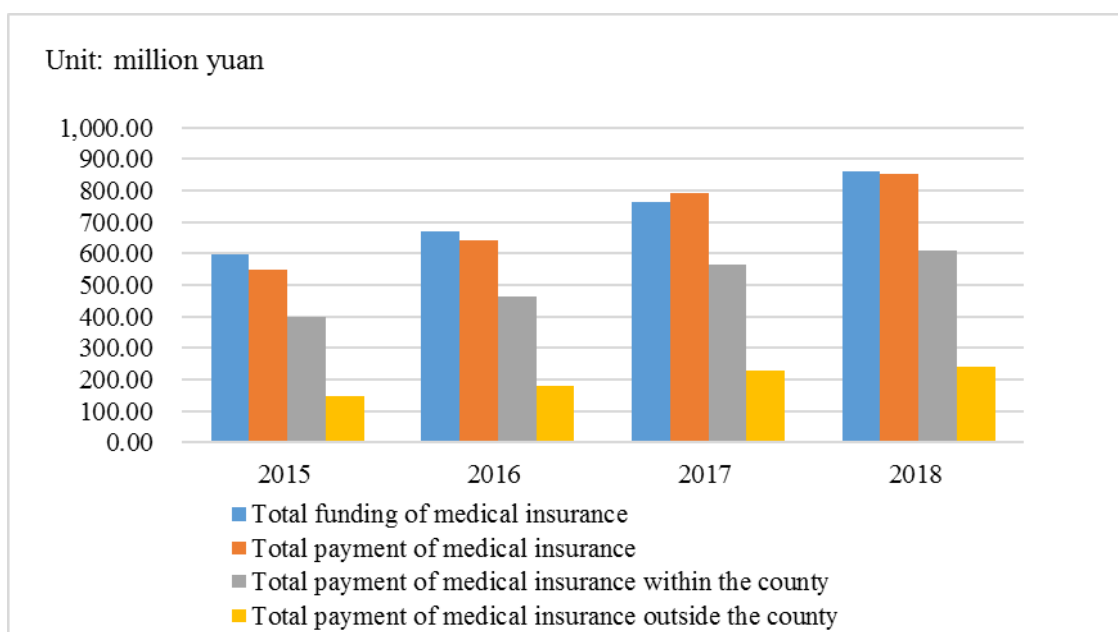


Figure 3.8 Funding and payment of medical insurance in 2015-2018

Source: Medical Reform Office of DC County (2018)

Through the analysis of the average cost of per hospital stay for patients in county-level, township-level, and private hospitals within and outside the county, it is found that, except for the township health centers that implemented disease-based payment in 2018, for all other hospitals, the average cost of per hospital stay increased, so that patients' personal burden continues to rise, as shown in Annex C Figure C.1.

3.4.6 Medical cooperation

In DC County, before the implementation of the new medical health group operating model, medical institutions were not affiliated with each other in operation and management, with

independent technology, personnel and finance.

Firstly, in terms of management, hospitals and health centers within the county belong to different management levels: the authority of appointment and removal of county-level hospitals' director belongs to the county-level government, and that of township hospital directors belongs to the county health administrative department. The majority of county-level hospitals also are at the same administrative level as the county health administrative department, with mutual cooperation and coordination, and competition as well.

Secondly, from the perspective of personnel management, the authority of personnel recruitment and dismissal of township health centers belongs to the county health administrative department, but county-level hospitals have the independent authority for personnel recruitment and dismissal. Township health centers compete with county-level hospitals for talents, which is detrimental to the maintenance of talents in grass-roots medical institutions.

Thirdly, for the finance, the finance of township health centers is subject to the dual supervision of the county health administrative department and county financial department, while that of county-level hospitals is supervised by the county financial department, but not by the county health administrative department. From the perspective of revenues, medical institutions at all levels hope that the number of patients will increase to improve their revenues.

Lastly, in terms of technology, county-level hospitals usually do not recognize the inspection results of township health centers. After a patient is referred from a township health center to a county-level hospital, the patient is required to conduct relevant inspections and tests again, which causes a waste of medical resources and increasing the burden on patients and medical insurance.

3.5 Summary

First, the medical security system is sound: in 2017, the county's medical insurance system consisted of county-level hospitals, township health centers, maternal and child care service care, traditional Chinese medicine service institutions, disease prevention and control institutions and other county and township medical service institutions, with a coverage rate of 99.8%.

Second, there is a risk of over-expenditure in medical insurance fund. Since 2015, the proportion of expenditure to total fund in medical insurance has been increasing year by year.

In 2017, the expenditure exceeded the fund, and the medical insurance fund is on the verge of collapse.

Third, the distribution of medical resources is unreasonable and service accessibility is insufficient: on the whole, high-quality medical resources are mainly concentrated in county-level hospitals, and the diagnosis and treatment capability of township hospitals is relatively low, with insufficient service accessibility and low recognition of patients.

Fourth, the flow of patients is disordered and so the medical burden on residents is heavy: many patients go to county-level hospitals directly beyond the grass-root medical institutions, resulting in idle grass-root medical resources and heavy burden on patients.

Fifth, there is a lack of information exchange, integration and coordination among hospitals: medical institutions do not recognize each other's inspection results and medical care information is not shared. Medical institutions operate independently, resulting in insufficient integration and low level of utilization efficiency in medical resources.

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Chapter 4: Methodology and Data

4.1 Introduction

This chapter, in compliance with the requirement of descriptive case study, mainly adopts qualitative research methods. Data sources mainly include documents from government and related departments, archives records, hospital statistics, participatory observation results, direct observation statistics, interviews with stakeholders, and physical objects. The collected data is also described and analyzed in this chapter.

4.2 Research roadmap and definitions

4.2.1 Roadmap of research

From the perspective of stakeholders, based on the data collected before and after the implementation of the Medical Treatment Combination Model in DC County, this thesis analyzes the impact of the operation model on patient flow, and then provides reference for the construction of county hierarchical diagnosis and treatment system and the performance evaluation system of county medical treatment association operation.

The technical roadmap of research is shown in Figure 4.1, in which we may highlight the following:

(1) Through literature review and analysis, the research summarizes relevant research results in the academic circle, defines relevant concepts and models, and analyzes existing problems and deficiencies. Through literature review, it analyzes the current research background and difficulties, research and development trend, and proposes the significance and value of the research.

(2) Consultation was conducted with the leading members of the leading medical institutions of four medical alliances and heads of Medical Reform Office in DC County through discussions and on-site visits.

(3) The research designs the content of investigation and interview and collects the opinions of stakeholders such as patients, medical staff and suppliers.

(4) The research collects and sorts out the data before and after the implementation of

medical alliance, conducts comparative analysis, and establishes the comprehensive evaluation system.

(5) The research aims to optimize and improve the current inefficient hospital operation model, solve the contradiction of the shortage and idleness of medical resources in the county, and realize efficient utilization of the resources.

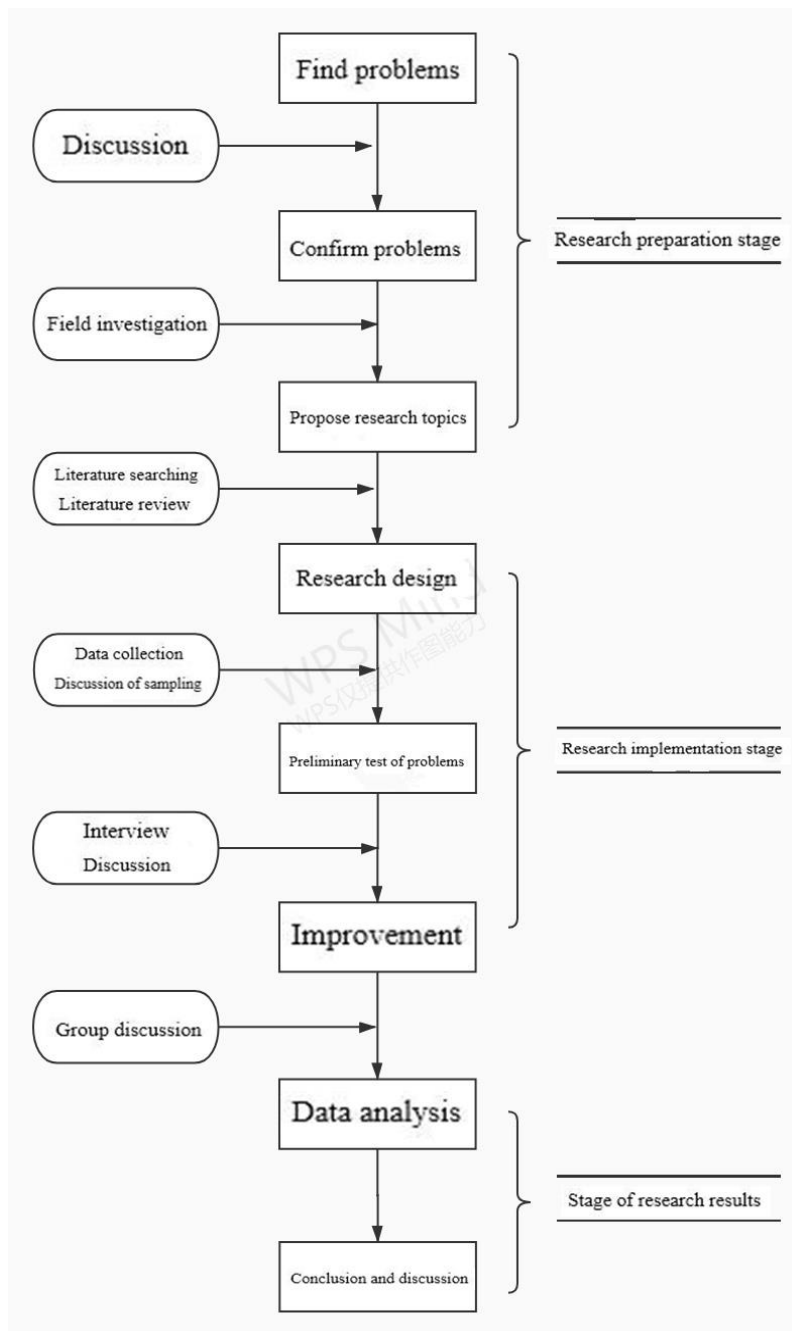


Figure 4.1 Technical roadmap of research

4.2.2 Definitions

The following definitions mainly refer to the relevant regulations promulgated in the *Basic*

Medical Hygiene and Health Promotion Law of China.(NPC Standing Committee, 2019)

4.2.2.1 County hospitals

County hospitals in this study refers to clinical treatment hospitals sponsored by the county government, which are the main places for residents of the jurisdiction to see a doctor and the treatment centers for the patients in this county who have clinical common, frequently-occurring and severe acute diseases. Leading the rural three-level medical network, county hospitals also undertake professional technical guidance and training for rural health institutions (NPC Standing Committee, 2019). The county-level hospitals under investigation of this study include People's Hospital, Second People's Hospital, TCM Hospital, and Maternal & Child Health Hospital in DC County, all of which are public hospitals.

4.2.2.2 Township healthcare centers

As comprehensive institutions responsible for health administration, medical treatment, disease prevention and primary basic health care at the county or township, township healthcare centers take charge of the medical and health care work in the area under administration, organize and lead mass health and disease prevention campaign, train health technicians, and provide professional guidance and consultation for grassroots health and medical institutions (NPC Standing Committee, 2019).

4.2.2.3 Private hospital

As a unique term in China, private hospitals refer to non-government and private medical institution. Most of them are medical institutions funded by the society and operate mainly for profit. A few of them are non-profit organizations and enjoy government subsidies, mainly including public-private partnership, joint-stock and private hospitals, and hospitals with investment from the Hong Kong Special Administrative Region (SAR), the Macao Special Administrative Region (SAR) and Taiwan Province as well as foreign countries (NPC Standing Committee, 2019).

4.2.2.4 Grassroots patients

Grassroots patients refer to the patients who receive the first consultation in grassroots medical and health institutions, and those who are referred to grassroots institutions from superior ones to seek treatment or get recovered, including those who seek treatment in township healthcare centers, urban community health service centers, village clinics and clinics (NPC Standing Committee, 2019).

4.2.2.5 Patients within the county

Patients within the county refer to the patients who seek consultation and treatment in medical institutions within the jurisdiction of their registered residence, including those in the county and township healthcare centers, community health service centers (stations), village clinics, clinics and private hospitals (NPC Standing Committee, 2019).

4.2.2.6 Patients outside the county

Patients outside the county refer to the patients who seek treatment in medical institutions of various levels outside the county where they are registered, including those referred following or not following the procedures (NPC Standing Committee, 2019).

4.2.2.7 Grassroots medical and health institutions

Grassroots medical and health institutions refer to medical and health institutions including township healthcare centers, community health service centers (stations), village clinics, infirmaries, outpatient departments and clinics (NPC Standing Committee, 2019).

4.2.2.8 Professional public health institutions

Professional public health institutions refer to various centers for disease control and prevention (CDC), specialized disease prevention and treatment institutions, health education institutions, emergency medical centers (stations) and blood stations (NPC Standing Committee, 2019).

4.2.2.9 Medical and healthcare personnel

Medical and healthcare personnel refer to medical practitioners, assistant medical practitioners, registered nurses, pharmacists (technicians), laboratory technologists (technicians), imaging technicians and rural doctors (NPC Standing Committee, 2019).

4.2.2.10 Hierarchical management of surgery

According to related regulations and based on the risk and difficulty, surgeries are divided into four levels: Grade-1 surgery refers to the ordinary surgery with low risk, simple procedure, and low technical difficulty; Grade-2 surgery refers to that with certain risks, moderate process complexity, and certain technical difficulty; Grade-3 surgery refers to that with a higher risk, more complicated procedure, and greater difficulty; Grade-4 surgery refers to a major operation with high risk, complicated procedure, and high difficulty (Ministry of Health, 2012).

4.3 Case study method

This thesis uses the case study method to set the research objects within the county, and takes the model of DC County in HN Province, China in the medical reform as the sample, so as to conduct a more in-depth, thorough, comprehensive and systematic analysis of research objects, and make a dynamic investigation or tracking of the objects at the same time (Yin, 1994). In this research, the construction of medical alliance in DC County is selected as the object of the case study. Through the design of case study, data collection, data analysis, and the research report writing, the impact of the operation model of medical treatment association on patient flow is obtained, which provides reference for China's county health reform. (Bryman, 2012; Kvale & Brinkmann, 2014)

4.3.1 Participatory observation and direct observation

This thesis uses the methods of participatory observation and direct observation to study the objects and collect data based on the research topics through on-site visits. Being the director of the Medical Reform Office, the researcher could deeply understand the actual situation more easily and provide more sufficient materials for the research. The thesis chose two main observation indicators, patient flow and influencing factors, for statistical analysis in order to achieve the research purpose.

4.3.2 Documents and archives records

Documents and archives records are important literature reflecting the operation of medical treatment associations in the county, which are the main basis of this research. The thesis refers to the government documents of DC County and data of such members of the medical alliance in DC County as People's Hospital, the Second People's Hospital, TCM Hospital, and Maternal & Child Health Hospital and Township healthcare centers. It combs and analyzes the relationship hidden in the data, and summarizes the correlation of relevant indicators, which serves as a reference for research design. The data and statistics are obtained from the following sources: The statistical system of the DC County Healthcare Security Administration and that of the DC County Health Administrative Department, and the Satisfaction Management Platform of National Public Hospitals (National Health Commission of the PRC, 2019).

4.3.3 Interview

Interview includes group discussions and interviews. This research chose a certain number of government officials, hospital managers, medical workers, patients and other stakeholders for interviews, so as to understand and grasp the demands and ideas of all stakeholders on medical security, thus providing reference for improving the operation model of medical alliance.

The interview belongs to unstructured and open interview. Each interviewee was interviewed for about 30 minutes to 1 hour. At least three to six interviews were conducted with some government officials, and interviews were repeatedly conducted for key links in an attempt to obtain a deeper understanding of the interviewees' thoughts and judgments.

4.3.3.1 Interviewees

(1) Representativeness: the respondents of this research are government officials of the health administrative departments and medical insurance departments, managers and medical workers of county and grassroots township healthcare centers (community health service centers), patients and residents, and hospital suppliers in DC County. In terms of the selection of the interviewees, in order to ensure the quality of the information obtained from the interviews, the interviewees should work or experience the medical service in DC County for more than three years. A total of 104 subjects were chosen, including six government officials, 18 heads of medical institutions, 20 medical workers, 50 patients and 10 suppliers. As these interviewees cover the major stakeholders involved in this research, they are rather representative (See Table 4.1).

(2) Age: as can be seen from Table 4.1, the average age of the 104 interviewees is 38.3 ± 6.2 years old (27 to 52 years old). Most of them are patients and medical personnel (including persons in charge and medical staff) with a majority of males and undergraduates or junior college students. The average age of the patients, one group of the interviewees, is only 36.9 years old. Most of the interviewed patients include not only the patients themselves but also their families (for example, the patients' parents, the patients' children, the patients' grandchildren, and the patients' daughters-in-law and sons-in-law). It is also a manifestation of the characteristics of traditional Chinese culture that patients' families personally make arrangements and accompany the patients to hospitals for medical treatment owing to their care for their families.

(3) Distribution: the occupations of the interviewed patients cover the main industries

and organizations in DC County, including workers, farmers, teachers, technicians, bank staff, salespeople, and waiters. The medical staff interviewed are distributed in county-level hospitals, township hospitals and private hospitals, including the doctors, nurses and heads of medical institutions at all levels. In terms of the interviewed suppliers, the major industries such as drugs, consumables and equipment, are taken into account. Although the government officials interviewed are in a small number, they include those closely related to the medical and health industry, such as the main leaders of the government, health administrative departments, medical insurance departments, and financial departments (See Table 4.1).

(4) Stakeholders: in line with the basic classification of Stakeholder Theory and taking into account the actual situation, this research made a simply classification of the interviewees according to the order of interest correlation: medical insurance funds, patients, medical institutions, medical personnel, government officials, and suppliers (See Table 4.1).

It is believed that in the new model, whether the medical insurance funds are safe or not is the main indicator to judge the success or failure of the reform. Once the health insurance funds fail to make ends meet, the reform cannot be carried out, in which the medical insurance funds become the decisive factor. The flow of patients is an important indicator to judge the success or failure of the reform. If the patient flow is not changed and the situation of “overcrowded county-level hospitals and empty township hospitals” continues, it means that the reform has not achieved its goals. Therefore, we regard medical insurance funds and patients as the primary stakeholders.

Medical institutions are the main place for the implementation of the reform, and at the same time, the impact on medical institutions also plays an important role in the continuous implementation of the new model. If the new model has a positive impact on medical institutions, it is conducive to the long-term, sustained and healthy development of medical institutions, due to which the new model can be continued; if the results of the operation of the new model are difficult for medical institutions to accept, it means that the reform cannot be further carried out. Therefore, medical institution is listed as an important stakeholder in the research.

Medical personnel are the direct participants, executors and implementers of the new model, and they are the direct providers of medical services. The attitude and acceptance of medical staff will directly affect the quality of medical services, and will also directly affect the quality of the implementation of the new model. This research believes that medical personnel are an indispensable important factor, so they are listed as important stakeholders in the research.

Although the number of the interviewed government officials is small, considering the national conditions of China, where government officials are the leading role in the formulation and implementation of policies, this research also regards government officials as important stakeholders.

Suppliers provide material, technical and logistical support for the normal operation of medical institutions. Considering China's increasingly deep marketization, more fierce market competition, and the limited influence it receives from the new model, supplier is listed as an ordinary stakeholder in the study.

Table 4.1 Basic information of 104 interviewees from 2019 to 2020

		Observed value	χ^2 value	P value
Age (years old, $\bar{x} \pm s$)	Total (No =104)	38.3±6.2	—	—
	Medical institution administrators (No =18)	44.8±4.0		
	Medical workers (No =20)	36.3±5.6		
	Patients (No=50)	36.9±5.4		
	Suppliers (No =10)	35.6±7.7		
	Government officials (No =6)	41.8±3.2		
The composition of gender, n (%)	Total	104 (100.0)	7.5	0.006
	Male	66 (63.5)		
	Female	38 (36.5)		
The composition of stakeholders, n (%)	Total	104 (100.0)	57.5	0.000
	Medical institution administrator	18 (17.3)		
	Medical worker	20 (19.2)		
	Patient	50 (48.1)		
	Supplier	10 (9.6)		
	Government official	6 (5.8)		
The composition of academic qualification, n (%)	Total	104 (100.0)	51.6	0.000
	Graduate with a master degree	16 (15.4)		
	Graduate with a bachelor degree	42 (40.4)		
	Junior college graduate	45 (43.3)		
	Senior high school graduate	1 (0.9)		

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Composition of medical institution administrators' units (%)	Total	18 (100.0)	0.2	0.637
	County-level hospital	4 (22.2)		
	Township health center	10 (55.6)		
	Private hospital	4 (22.2)		
The composition of medical worker, n (%)	Total	20 (100.0)	9.8	0.002
	Doctor	17 (85.0)		
	Nurse	3 (15.0)		
The composition of medical workers' units, n (%)	Total	20 (100.0)	7.2	0.007
	County-level hospital	8 (40.0)		
	Township health center	8 (40.0)		
	Private hospital	4 (20.0)		
Occupational composition of patients, n (%)	Total	50 (100.0)	7.8	0.165
	Worker	9 (18.0)		
	Farmer	10 (20.0)		
	Teacher	8 (16.0)		
	Technician	7 (14.0)		
	Bank clerk	4 (8.0)		
	Businessman	5 (10.0)		
	Waiter	7 (14.0)		

4.3.3.2 Interview question design

The interview is designed aiming at the analysis is of the impact of the integration of medical resources on stakeholders and the impact of the new model on the flow of patients (Table 4.2). The framework of the interview is based on the impact on the selected six main stakeholders, including medical insurance funds, medical institutions, medical personnel, patients, suppliers and government officials. Different groups of interviewees are studied from different aspects, according to which different interview topics are designed on the basis of investigation and demonstration.

The biggest policy change in the new model is the reform of the payment mode of medical insurance. This is the reason why the impact on health insurance funds is studied as a very important issue in the interview. Taking the interviewees' attitude, understanding and evaluation as the basis, the interview also focuses on the comparison of medical insurance payment in 2019 and 2018, so as to provide the management and prediction of the risk of

overspending, as well as the judgment and understanding of the actual situation.

The interview with the heads of medical institutions mainly focuses on the comparison of the data of disease structure, bed rotation rate and pathogenic structure in 2019 and 2018. The impact of the new model on medical institutions is also studied (Table 4.2).

Medical personnel are the direct providers of medical services, the main force of medical and health undertakings, and the direct stakeholders of medical integration. The interview of medical staff mainly focuses on the impact of the new model on medical staff and the staff's experience and attitude towards the new model (Table 4.2).

Interview with patients mainly focuses on the experience of seeking medical treatment, especially the increase or decrease of the burden of medical expenses and the convenience and accessibility of medical treatment, because these are the main factors that directly affect the flow of patients (Table 4.2).

The interview with suppliers of medical institutions focuses on the impact on the efficiency of suppliers. As we know little about suppliers, the interview aims to obtain specific examples of the positive and negative effects on suppliers (Table 4.2).

The interview with the government officials involves two aspects: first, the specially designed interview for the key officials in the government and the departments of medical insurance, health, and finance; second, the interview related to the impact on medical insurance funds (Table 4.2).

Table 4.2 Interview Outline

Interview Content/Category	Interview Questions	Interviewees/Stakeholders	The Number of Interviewees (n=104)
1 The effect of MHG+IBPMI on the risk of overspending of medical insurance funds	Has MHG+IBPMI increased or controlled the risk of overspending? Has MHG+IBPMI worked better or worse than you expected? Has MHG+IBPMI led to better or worse results after being implemented?	Government officials: leading members of the DC County Government, management personnel of the DC Healthcare Security Bureau and of the DC Health Commission	6
2 The effect of MHG+IBPMI on local medical insurance department, health administrative department and financial	What's your attitude towards MHG+IBPMI? What changes has MHG+IBPMI brought about? What are your worries and hopes about MHG+IBPMI? Do you have any other ideas on MHG+IBPMI but not	Government officials: major management personnel of the medical insurance department, the health administrative department and the financial department of DC County respectively	

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3	<p>department</p> <p>The effect of MHG+IBPMI on medical institutions, including county-level hospitals, township healthcare centers and private hospitals</p>	<p>being mentioned in former interview questions?</p> <p>What do you think about the effect of MHG+IBPMI on hospitals?</p> <p>What do you think about the sustainability of MHG+IBPMI?</p> <p>Do you think MHG+IBPMI can lead to long-term sustainable development of medical institutions?</p> <p>What's the effect of MHG+IBPMI on the downward flow and sound allocation of medical resources?</p> <p>What's your general attitude towards MHG+IBPMI?</p> <p>What's the effect of MHG+IBPMI on lawful practice of medical workers?</p>	<p>Persons in charge of medical institutions: management personnel of county-level hospitals, township healthcare centers and private hospitals of DC County respectively</p>	18
4	<p>The effect of MHG+IBPMI on medical workers</p>	<p>Has MHG+IBPMI affected your income?</p> <p>What effect MHG+IBPMI has on your vocational development and promotion?</p> <p>What are your hopes and requirements about MHG+IBPMI?</p> <p>Do you think MHG+IBPMI has increased or reduced the burden of medical expenses?</p> <p>Do you think MHG+IBPMI has made medical services more convenient and available?</p>	<p>Medical workers: doctors, nurses and technicians from county-level hospitals, township healthcare centers and private hospitals of DC County respectively</p>	20
5	<p>The effect of MHG+IBPMI on patient flow, medical payment and experience</p>	<p>Does MHG+IBPMI make you feel more satisfied with medical services?</p> <p>What do you think about medical safety and service quality under MHG+IBPMI?</p> <p>What effect do you think MHG+IBPMI has on patient flow?</p>	<p>Patients: patients from county-level hospitals, township healthcare centers and private hospitals of DC County respectively</p>	50
6	<p>The effect of MHG+IBPMI on suppliers of medicines, consumables and medical devices of medical institutions</p>	<p>What's the effect of MHG+IBPMI on enterprise benefit?</p> <p>Are there any examples demonstrating the positive or negative effect of MHG+IBPMI on suppliers?</p> <p>From the enterprise perspective, what do you</p>	<p>Suppliers: relevant suppliers of county-level hospitals, township healthcare centers and private hospitals of DC County respectively</p>	10

think about MHG+IBPMI
and why?

4.3.3.3 Analysis of interview results

For the analysis of the interviews, the content analysis was applied. Table 4.3 shows the codes used for each category and the frequency those codes appeared in the answers to the questions shown in Table 4.2.

Table 4.3 Content Analysis of Interview

Interview Content/Cate- gory	Interviewees/Sta- keholders	Code	Frequency	
			Results	Number (Percentage)
1 The effect of MHG+IBPMI on the risk of overspending of medical insurance funds	Government officials: leading members of the DC County Government, major management personnel of the medical insurance department, the health administrative department and the financial department of DC County respectively (n=6)	1 Better/worse risk control	Better	6 (100)
			Worse	0 (0)
			Better	5 (83.3)
2 The effect of MHG+IBPMI on local medical insurance department, health administrative department and financial department	Government officials: leading members of the DC County Government, major management personnel of the medical insurance department, the	2 Better/worse than expected	Worse	0 (0)
			Abstain	1 (16.7)
3 Positive/negative MHG+IBPMI about	Government officials: leading members of the DC County Government, major management personnel of the medical insurance department, the	3 Positive/negative MHG+IBPMI about	Positive	5 (83.3)
			Negative	1 (16.7)

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	health administrative department and the financial department of DC County respectively (n=6)			Positive	6 (100)
		4	Positive/negative about government creditability		
				Negative	0 (0)
3	The effect of MHG+IBPMI on medical institutions, including county-level hospitals, township healthcare centers and private hospitals	5	MHG+IBPMI is good/bad for county-level hospitals	Better	16 (88.9)
				Worse	0 (0)
				Abstain	2 (11.1)
		6	MHG+IBPMI is good/bad for township healthcare centers	Better	16 (88.9)
				Worse	0 (0)
				Abstain	2 (11.1)
		7	MHG+IBPMI is good/bad for private hospitals	Better	10 (55.6)
			Worse	8 (44.4)	
4	The effect of MHG+IBPMI on medical workers	8	Positive/negative about MHG+IBPMI	Positive	17 (85.0)
				Negative	1 (5.0)
				Abstain	2 (10.0)
		9	MHG+IBPMI has increased/reduced medical service income	Increase	17 (85.0)
				Reduce	3 (15.0)
10	MHG+IBPMI is positive/negative for vocational development and promotion	Positive	17 (85.0)		
			Negative	2 (10.0)	
			Abstain	1 (5.0)	
5	The effect of Patients: patients	11	Higher/lower satisfaction	Higher	48 (96.0)

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MHG+IBPMI on patient flow, medical payment and experience	from county-level hospitals, township healthcare centers and private hospitals of DC County respectively (n=50)	12	with medical services	Lower	2 (4.0)			
			Increased/reduced burden of medical expenses	Increase	1 (2.0)			
				Reduce	45 (90.0)			
				Same	4 (8.0)			
			Better/worse convenience and availability of medical services	Better	47 (94.0)			
				Worse	3 (6.0)			
				More patients turn to township healthcare centers/county-level hospitals (in the primary medical treatment)	More to township healthcare centers	45 (90.0)		
					More to county-le vel hospitals	5 (10.0)		
			The effect of MHG+IBPMI on suppliers of medicines, consumables and medical devices of medical institutions	Suppliers: relevant suppliers of county-level hospitals, township healthcare centers and private hospitals of DC County respectively (n=10)	15	MHG+IBPMI leads to better/worse enterprise benefit	Better	5 (50.0)
							Worse	3 (30.0)
Abstain	2 (20.0)							
Positive	5 (50.0)							
Negative	4 (40.0)							
6		16	Positive/negative about MHG+IBPMI	Abstain	1 (10.0)			

Summarizing the content analysis of the interviews shown in Table 4.3:

(1) The impact of the medical alliance model in DC County on the risk of overspending of health insurance funds: six government officials were interviewed on this topic, and they answered all the assigned questions. The results show that all the interviewees regard the medical insurance risk as the most concerned issue; they also agree that the new model has controlled the risk of overspending medical insurance, and the actual situation has been improved compared with that before the implementation of the new model. The interview results have confirmed the results obtained from the analysis of the data and information extracted in the study.

Several interviews show that medical insurance officials were opposed at the model in the beginning and they even raised questions and concerns about the sustainable operation of the new model, but they had no credible evidence, just their speculation.

It is also showed that three main government leaders interviewed unanimously support the new model and fully affirm the results of the implementation, which implies that their evaluation of the impact of the new model on the overspending risk of medical insurance funds tends to be consistent. Government officials except those in the medical insurance department are generally worried that although the new model has achieved relatively

satisfactory results and the provincial and national health administrative departments have also recognized it and suggested its promotion, the overall planning model of health insurance funds has been changed from county-level to city-level coordination, and the next may be provincial coordination, so the reform of medical insurance management rights will be more sensitive and incentive, which is a great concern in the future.

(2) The impact of medical alliance model in DC County on medical institutions: in this section, 18 persons are interviewed, who are in charge of the county-level hospitals, township health centers and private hospitals. The interviewees cooperated well and actively responded to the questions raised in the interview. Four heads of county-level hospitals gave positive comments on the new model, believing that the new model reverses the profit-seeking direction of medical institutions, and also stimulates the motivation of medical institutions to treat scientifically, use drugs rationally and consciously control unreasonable medical expenses. The independent disposal of the remaining medical insurance funds has improved the financial situation of the hospitals. According to the provisions of the new model, when hospital development funds have been guaranteed, the salaries of medical staff have also been raised, which leads to a virtuous circle for hospital management and sustainable development. Considering the actual situation of their health centers, 12 heads of township health centers talked about the changes after the implementation of the new model, which unanimously reflected that there is a significant increase in the number of patients in township health centers compared with that before the implementation of the new model. Besides, there is also an increase in financial income. The improving financial situation has provided financial support for the development of township health centers, and the raise of medical staff salary has stopped brain drain. Experts of county-level hospitals go to township health centers for teaching and consultation, and at the same time, the medical staff of township health centers go to county-level hospitals to study. This mechanism greatly improves the medical staff's ability of diagnosis and treatment in township health centers; there is also a significant increase in the variety of diseases that are treated in the township hospitals, as well as the utilization rate and turnover rate of beds. For the heads of township health centers, they are dissatisfied about the integration of financial management, which restricts and supervises the managers' financial power in the township health centers. This contributes to the standardized management, but the managers' autonomy is restricted, which has a certain impact on the enthusiasm of the heads of township health centers. Two heads of private hospitals are resistant to the new model, because the diagnosis and treatment in private hospitals should be supervised by county-level hospitals in the medical alliance. As the supervisors sent by

county-level hospitals are all well-known experts in the county, the supervision of the diagnosis and treatment in private hospitals are strict. Besides, the penalty for non-standard diagnosis and treatment is also severe. As a result, the number of patients and the financial income received by private hospitals greatly reduced, which requires private hospitals to make a complete change in the policy of diagnosis and treatment. Although the private hospitals are also allocated with the remaining medical insurance funds, the overall financial income has decreased significantly compared with that before the implementation of the new model. In addition, the level of private hospitals' business and technology is relatively low, so it is difficult for them to reach an ideal status in the short term. Hence, the finance will fall into a low level for a long time, making it more difficult for the development of private hospitals.

(3) The impact of the medical alliance operation model in the DC County on medical staff: the feedback from the 20 medical workers interviewed varied. In general, the majority took a positive attitude. To be specific, 17 people had a favorable view, 2 people adopted a wait-and-see attitude and 1 person held negative view.

Those who took a positive attitude are all medical staff in public medical institutions. Their feedback can be summarized as follows: first, they believe that the new model has enabled medical staff to return to their fundamental duty of treating diseases and saving people. With the new model, clinical medical staff no longer need to take into account the issue of profitability when treating diseases. They only need to conduct scientific and effective treatment on patients, thus avoiding the risk of illegal practice caused by excessive diagnosis and treatment because of profit concerns; second, the income of medical staff has increased significantly compared with that before the implementation of the new model, thereby inspiring the enthusiasm of medical staff; third, hospitals' investment in improving the level of diagnosis and treatment provides a platform for better personal development and promotion, and offers better conditions for the improvement of medical workers' professional skills; fourth, 7 medical workers from township health centers hold that the return of patients has increased the workload of diagnosis and treatment, and their work schedule has been much tighter than in the past. But they are willing to accept since their current salary has been greatly increased, and the opportunities and space for growth have also been expanded. Among the interviewees, 5 department administrators from county-level hospitals mentioned that the structure of the disease types of the patients treated has changed. The number of patients with common diseases has decreased, and the number of difficult cases has increased, which puts a lot of pressure on medical staff, and also motivates county-level hospitals to

enhance their professional skills. Generally, medical staff in public hospitals see hopes, so they wish that the new model can continue to be implemented.

Different from the medical staff in public hospitals, the 3 medical workers in private hospitals interviewed reported that they were hard hit by the implementation of the new model. The reasons are as follows: first of all, the diagnosis and treatment behavior was under unprecedented strict supervision. Under the reward and punishment system of private hospitals, many medical staff have been punished for unreasonable diagnosis and treatment behavior; secondly, the number of patients admitted has been reduced, so their salary dropped by a large margin. Coupled with the lack of a platform for growth and professional skill enhancement, some medical staff even intend to leave; thirdly, some medical personnel have relatively low academic qualifications and professional skills. For them, it is difficult to obtain various opportunities in public hospitals, and it is difficult to improve the situation of private hospitals in the short term. This type of personnel has been hit the hardest. The medical staff of private hospitals hope that private hospital managers can take effective measures to improve the unfavorable situation as soon as possible. They also hope that the government can adopt a more modest policy based on the actual situation of private hospitals so as to give private hospitals time to adapt.

(4) The impact of the operation model of the DC County medical alliance on patients: 48 interviewees recognized the implementation of the new model, while 2 interviewees expressed dissatisfaction with the restrictions on medical treatment outside the county and hoped for greater degree of flexibility.

Analysis of the medical expenses burden after the implementation of the new model: 45 patients said that the medical expenses after the implementation of the new model were lower than before. They respectively mentioned that the medical burden was significantly reduced compared with the same period last year; 42 interviewees held that the mutual recognition of the inspection results of county and township hospitals reduced the number of repeated examinations for patients, sped up the efficiency of medical treatment, as well as saved time and costs;

Analysis from the perspective of convenience and accessibility of medical service: 32 interviewees who were referred from a township health center to a county-level hospital expressed satisfaction with the green channel for referrals. Especially there was no difficulties in transferring from a township health center ward to a county-level hospital ward. Before the patient arrives at the county-level hospital, the medical records and patient data have already reached the receiving doctor through information technology, which is unprecedented and

efficient; 18 interviewees were transferred from the county-level hospital to the township health center for rehabilitation after operation. Fifteen of them said that the quality of medical services during the rehabilitation period after they were transferred to the township health center was not reduced, while the medical expense dropped. Besides, they can also take care of their families nearby. These led to the positive evaluation from them.

Analysis from the perspective of medical safety and service quality: 38 interviewees praised the homogenized services after the implementation of the new model. In particular, doctors from county-level hospitals regularly visit township health centers for consultations, so that patients in township health centers can enjoy the same medical services quality as county-level hospitals. The medical safety and medical service quality in township health centers have undergone tremendous changes compared to the past.

Analysis of patient flow: 40 interviewees expressed their willingness to go to township health centers for the first consultation. The main reason is that they trust in the level and quality of diagnosis and treatment of township health centers after the implementation of the new model. Meanwhile, other contributing factors also include the convenience of seeking medical service, reduced costs and highly efficient referral mechanism.

(5) The impact of medical alliance operation model in the DC County on government officials: the interviewees in this section are six government officials, and the aim of the interview is mainly to summarize government officials' attitudes, focus points, and evaluation of the new model.

The actual attitude towards and the impact of the new model: 5 of the 6 government officials interviewed expressed their approval. In their eyes, generally, the new model solves the risk of medical insurance payment, reduces the burden of medical expense for patients, and especially unifies the pursuits of medical insurance, hospitals and doctors, which has promoted the sound development of medical and health industry. Government officials are more concerned about whether the burden on patients can be reduced. As the problem of "expensive medical service" has been widely criticized for many years, whether the burden on patients can be reduced has become the focus of government and government officials. Government officials have given unanimous recognition to the relief of the burden on patients after the implementation of the new model. The new model has been recognized by the provincial and national medical reform departments, and has been regarded as a typical example of medical reform. A number of rewards awarded to the new model have improved the reputation of the government; however, officials from the government's medical insurance department expressed different opinions, believing that the new model runs counter to the

government's institutional reform to establish a medical insurance department and weakens the rights of the medical insurance department.

The concerns of government officials: 6 interviewees expressed different concerns, which can be summarized into three aspects: first, they worry that medical institutions will compromise the quality of medical services in order to save medical insurance funds, causing dissatisfaction among patients; second, private hospitals have been severely impacted, and are facing survival risks. They are worried that private hospitals will close down and cause social instability; third, they doubt whether the model can continue to be implemented. After all, the influence of a pilot county-level area is too weak to challenge the existing policies.

The question of what the government officials expect was set up to make up for the problems that this interview could not take into account: 6 government officials expressed different expectations: 3 main government officials hoped that the new model will continue to be implemented.

(6) The impact of the medical alliance operation model in DC County on medical institutions' suppliers: in the interviews with medical institutions' suppliers, this study selected 10 business workers who have close business relationship with DC County medical institutions in medicines, consumables, and medical devices.

Four interviewees from drug suppliers said that the impact mainly came from the following aspects: first, shortly after the implementation of the new model, the four medical groups collectively began to organize centralized drug bidding, adopting the policy of "volume-based procurement and quantity-based pricing". Prices have been drastically lowered, and the drug supply mode has changed from the past decentralized supply mode to the current centralized one. Meanwhile, the use of non-essential drugs has been curbed, resulting in the decrease in drug consumption; second, because hospitals have the right to manage and use medical insurance funds, the drug payment period is greatly shortened. As a result, the capital flow of pharmaceutical companies is accelerated, and there is no need for them to borrow from banks to maintain operations; third, the purchase and sale of drugs is further regulated, the supervision is further strengthened, commercial bribery such as kickbacks is greatly curbed, and the business risk of enterprises is greatly reduced. Pharmaceutical companies dismissed some employees engaged in marketing because they do not need so many "pharmaceutical sales representatives" now.

The positive effects on suppliers are reduced business risks and sharply increased net profit margins; the negative effects are reduced drug consumption, lower drug prices, and lower corporate turnover.

For drug suppliers, the new model is generally more of a pleasure than a worry mainly because they still hold a certain wait-and-see attitude towards the new model, hoping that the new model can be fixed, so that companies can formulate longer-term business strategies.

The attitudes of the three consumable suppliers towards the new model are mixed: in the interviews, it is generally expressed that after the implementation of the new model, the number of inspections and the amount of non-essential consumables has continued to decline. Centralized bidding and volume-based procurement makes the price lower, resulting in the significantly reduced turnover of the consumable suppliers. Although the expenses on consumables kickbacks have been greatly reduced, the turnover and profits of the suppliers have also been significantly reduced compared with the past. The three interviewees almost simultaneously lamented that the era of high profits was gone; after downsizing and standardizing marketing, the ratio of operating cash flow to net profit of consumables suppliers has been greatly improved, prompting enterprises to adjust and transform their operation model.

The attitudes of the three equipment suppliers tend to be welcoming. They mentioned why they were excited about the new model in the interview: first, since the implementation of the new model in the second half of the year, medical groups have witnessed a surge in the purchase and renewal of new equipment, and the amount of new equipment has almost reached more than 3 times that of the past year. Especially in township health centers, due to the injection of medical insurance funds and the support of the leading county-level hospital, the equipment that was badly needed yet unaffordable in the past has been updated in a short time; second, because of the increase in the types of diseases and intractable diseases in county-level hospitals, the demand for sophisticated equipment gradually appears and increases. Facilities and equipment only available in provincial and municipal hospitals in the past have also been added to the equipment catalog of county-level hospitals; third, the shortening of the payment period for the equipment purchased is conducive to the suppliers' capital flow. However, suppliers are also dissatisfied with the two aspects below: one is that medical institutions have kept equipment prices low during the procurement process, and suppliers' profits have been reduced compared with the past; the other is that, compared with the past, medical institutions have put forward stricter requirements on equipment after-sales services, such as shortened equipment troubleshooting period.

4.3.4 Physical evidence

Physical evidence refers to the evidence of various resources in the form of physical objects. Generally, it always refers to the actual evidence obtained by the auditors through checking the authenticity of the property is the best evidence for the actual existence of the property and material. The research analyzed physical evidence such as financial statements and patient records of medical institutions, and medical insurance reimbursement vouchers of patients, and explored the interrelation among these indicators reflecting the patient flow and related factors, so as to obtain the basis for change.

The physical evidence of this research was obtained by means of solicitation and voluntary provision by the parties concerned. At the same time, relevant data related to this research were collected and analyzed according to the information released by Chinese authorities on the Internet and media.

4.4 Main observation indicators

4.4.1 Data collection

The main observation data of this study are as follows:

4.4.1.1 Patient flow

In this research, patient flow refers to patients' selection of medical institutions, and the treatment outcome and patient flow during treatment. The scientific, reasonable and orderly flow of patients is the main approach to coordinate the use of regional health resources and promote the development of health services. As a direct reflection of the allocation and utilization of medical resources and the scientific nature of medical system, patient flow is an important basis for this research.

4.4.1.2 Patients' selection of medical institution for the first consultation

Patients' selection of medical institution for the first consultation is the starting point, the source, the first direction and the first indicator of patient flow. This thesis divides the selection of medical institutions of patients in DC County for the first consultation into the following categories: village clinics (family contracted doctors), grassroots medical and health institutions (township healthcare centers and community health service centers), county hospitals and medical institutions outside the county. By consulting the relevant data of

medical insurance reimbursement of patients in medical insurance institutions, the research calculated the proportion of patient flow and then analyzed the influence factor of choosing medical institutions.

4.4.1.3 Total number of visits

The total number of visits refers to the total number of people seeking treatment in medical and health institutions, which generally includes the total number of outpatients and emergency cases, inpatients, and patients who receive medical treatment outside hospitals. The number of inpatients refers to the total number of patients hospitalized for treatment and rehabilitation in a medical institution at an administrative region within a period of time, usually taking the year or month as the statistical period. The total number of visits and inpatients observed in this research includes those at county-level hospitals, township healthcare centers and private hospitals.

4.4.1.4 Average length of hospital stay

Average length of hospital stay refers to the average length of hospital stay of inpatients in a hospital during the treatment period, usually on an annual basis. The average length of hospital stay observed in this research includes that in the county-level hospitals, township healthcare centers and private hospitals.

4.4.1.5 Two-way referral rate

Two-way referral rate is a direct reflection of the medical order of grassroots patients and the implementation of the hierarchical treatment system. Patients make the first consultation at the grassroots level and treat minor diseases at grassroots medical institutions. Those who need to be treated in superior hospitals are referred in an orderly manner after evaluation by grassroots hospitals. The downward referral rate of patients in the rehabilitation period at superior hospitals reflects the construction and implementation of the hierarchical diagnosis and treatment system and two-way referral system in the county, and also indicates the close degree of cooperation and collaboration among medical institutions, the patients' trust in them and their service accessibility. Moreover, the two-way referral rate is also an important indicator of efficient utilization of resources.

4.4.1.6 Changes in hospitalization expenses

The research observes the statistics data of patients' hospitalization expenses before and after the implementation of Medical Treatment Combination Model, and analyzes the compared

changes and the influence of the operation model on patients' burden and medical insurance payment. The average cost of inpatients refers to the average medical expenses paid by inpatients in a hospital during the treatment period, usually on an annual basis. The average cost of inpatients in this research includes the patients in county-level hospitals, township healthcare centers and private hospitals.

4.4.1.7 Changes in the payment of medical insurance

The thesis compares and analyzes the changes of payment of medical insurance (i.e., the medical insurance income of hospitals at all levels) before and after the implementation of Medical Treatment Combination Model, and the impact on the payment risk and sustainability of medical insurance.

4.4.1.8 Development of township healthcare centers

The thesis compares and analyzes the changes of human resources and equipment before and after the implementation of Medical Treatment Combination Model, and the impact on the development factors of township hospitals and on sustainable development.

4.4.1.9 Changes in patient satisfaction

By comparing and analyzing the changes of patients' satisfaction before and after the implementation of Medical Treatment Combination Model, this thesis analyzes the impact of the new model on patients' medical experience. The result of patient satisfaction survey comes from China's national public hospital satisfaction survey management platform (National Health Commission of the PRC, 2019).

4.4.2 Key content for data collection

In data collection, this thesis designed the influencing factors according to the three models, namely, the respective operation model, the operation model of loose medical treatment partnership, and the operation model of compact medical alliance, in order to observe five key indicators, including medical reform policy, distribution of medical resources, brand influence, medical insurance reimbursement policy and patient satisfaction. Data collection and interviews are mainly conducted on stakeholders.

4.4.2.1 Medical reform policy

Medical and health system reform policy is an important external factor affecting hospital operation, and the most direct signal of the direction of medicine and health care of the

government. The policy often acts as an indicator to the operation model of hospital, and the investigation of the policy can find out whether the model designed by the researcher is consistent with the policy. The interview mainly sorts out the indicators and requirements of medical reform policy.

4.4.2.2 Distribution of medical resources

The status of medical resources in China is also the external basis of hospital operation and the implementation of Medical Treatment Combination Model. The distribution of medical resources of the research objects is mastered through statistical investigation. The main indicators are the number of medical institutions, open beds, doctors, nursing staff and medical technicians.

4.4.2.3 Brand influence

Through a descriptive analysis of the main reasons why patients choose medical institutions, hospital departments and medical workers in the treatment process, the research investigated and analyzed the brand influence on patients' selection of treatment.

4.4.2.4 Medical insurance reimbursement policy

Through a descriptive analysis of the influencing factors of medical insurance reimbursement policies on the selection of medical institutions by patients in the treatment process, the research sorts out the influence of medical insurance reimbursement policies on the choice of treatment.

4.4.2.5 Patient satisfaction

The research compares patients' satisfaction before and after the implementation of Medical Treatment Combination Model, and then analyzes the change of patients' medical experience, which becomes an indicator to measure the social benefits brought by the change of the model.

4.5 Statistical description

This thesis presents a descriptive case study. The measurement data involved in the research are expressed as mean \pm standard deviation, the count data are expressed as a proportion, and the chi-square test (χ^2) is taken for the comparison of the difference between the count data groups. $P < 0.05$ means that the difference is statistically significant at 5% significance level.

4.6 Summary

This research mainly adopts case study method, combined with interviews, literature review and archives review to observe the impact after the setup and implementation of Medical Treatment Combination Model (MHG+IBPMI) in DC County on a number of indicators, including patient flow, selection of medical institutions, number of visits, average length of hospital stay, two-way referral rate, medical insurance payment, patients' hospitalization expenses, and patient satisfaction.

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Chapter 5: The Impact of Implementing Medical Treatment Combination Model on Stakeholders and Patient Flow in DC County

5.1 Introduction

This chapter mainly introduces the new reform operation and management model designed and implemented by DC County—that is, the Medical Treatment Combination Model (MHG+IBPMI) (see the explanation below). Designing a newly reformed operation and management model—that is, the Medical Treatment Combination Model, lasted for two years (from August 2016 to September 2018), after repeated investigations, discussions and demonstrations. The Medical Treatment Combination Model has been implemented since October, 2018. This research mainly analyzes the relevant situation after the implementation of the newly reformed operation and management model in DC County, and evaluates the impact of the model on the county-level regional stakeholders and the flow of patients.

5.2 Key points in Medical Treatment Combination Model (MHG+IBPMI)

The planning of the medical reform in DC county starts with the top-level design to subvert the old medical system, implement the Medical Treatment Combination Model, the new operation model featuring “the integration of county and township medical institutions plus integrated bundled payment of medical insurance” (MHG+IBPMI), and construct a whole new type of medical alliance with tight interconnectivity. Under the government’s leadership, the medical reform work group composed of major leaders of county government was set up to be responsible for the overall progress of various reform tasks. The implementation of specific work was carried out by the office under the medical reform work group.

5.2.1 Construct medical alliance

The *Implementation Opinions on Constructing Medical and Health Groups in DC County* was formulated and issued in the name of the leading group for the overall progress of the construction of the medical alliance in DC County. The main objective was to set up four

medical and health groups by the end of 2018, which are led by the people's hospital, the traditional Chinese medicine hospital, the second people's hospital and the maternal & child health hospital of the county respectively; to improve the operation system and mechanism of the medical and health groups in 2019; to achieve the goal that the self-discipline and service ability of the medical and health groups will be developed, the efficiency of resource utilization will be significantly improved, the health level of people in the county will be obviously higher than that of people in nearby cities and counties in 2020 (People's Government of DC County, 2018a).

The medical and health groups in DC county are as follows: the first medical and health group is composed of the first people's hospital and 9 township healthcare centers in DC county with people's hospital taking the lead; the second one is composed of the traditional Chinese medicine hospital and 6 township healthcare centers (community health service centers) in the county with the traditional Chinese medicine hospital taking the lead; the third one is composed of the second people's hospital and 5 township healthcare centers (community health service centers) in the county with the second people's hospital taking the lead; and the last one is composed of the maternal & child health hospital and 3 township healthcare centers (community health service centers) in the maternal & child health hospital taking the lead. Members of the health group are fully integrated in such aspects as personnel, finance and resource and their management. And the functional tasks are integrated into the group as a whole to form a complete community with shared management, service, interest, responsibility and culture. Private hospitals in the county shall be under the management of local medical and health groups (People's Government of DC County, 2018a).

5.2.1.1 Realize the model of integrated management of village, township and county hospitals

All the village health centers are included in the integrated management, the leading hospitals of the various groups are responsible for extending services and include them into integrated management. Other individual clinics, based on free will, can also be incorporated into the integrated management. Medical equipment, drugs, and consumables owned by groups are procured and distributed uniformly. The goal is to promote the construction of primary medical and health institutions in various groups, constantly improve facilities and equipment in rural areas.

5.2.1.2 Reform the internal management system of medical and health groups

The medical and health groups reform the original management method, put in place new governance model, and implement the president accountability system for business and administrative work. The presidents of the township healthcare centers which are members of medical and health group are nominated by the leading hospitals of various groups and appointed by the county health administrative department. The task is to establish and implement the modern hospital management system, formulate the governance constitution that conforms to the reality of medical and health group, and establish and improve the internal organization, management system and council system.

5.2.1.3 Actualize the operation autonomy of medical and health groups

The county government should release policies to ensure that the autonomy of the medical and health groups in post setting, personnel management, personnel recruitment, business development strategies and income distribution can be actualized so as to stimulate the vitality and endogenous development motivation of the medical and health group.

5.2.1.4 Strengthen the reform of salary system

In accordance with the requirements of “encouraging the exploration and implementation of medical and health groups to break through the current salary level, and allowing hospitals to use the surplus capital after cost deduction and related funds for medical workers rewarding and motivation”, a new salary system that meet development requirements should be established to stimulate endogenous motivation of hospitals, reasonably improve the salary level of medical workers, and form a community of shared interests involving medical insurance, medical and health institutions, doctors and patients.

5.2.2 Reform the payment of health insurance

The current payment method of health insurance shall be reformed and complies with the system of allowing responsibilities to medical and health groups. That is to say, according to the basic principle of “setting overall budget based on the total number of patients, 10% of the total annual health insurance fund shall be put aside as risk fund; the remaining 90% is regarded as the total budget, and then handed over to each medical and health group for management based on the number of insured people in each group. Thereafter, the medical and health group is responsible for the insurance reimbursement of residents of the group’s jurisdiction, and the balance is reasonably allocated and independently controlled by the

medical and health group. For patients (covered by health insurance) admitted to other medical institutions which are not included in the medical and health group or even hospitals outside the county, the medical group shall settle the payment with the hospital that admits the patient by “purchasing services”. Besides, the medical expenses of outpatient service, general diagnosis treatment fees and contracted service fees of family doctor should be covered by insurance.

5.2.3 Reform operation and management

5.2.3.1 Unify human resource management

The president of township health centers in the medical and health group is nominated by the leading hospitals of the medical and health groups, and appointed by the county health administrative department.

As for the management policy of human resources, according to the rules that “jobs and staffing shall be applied in township under county regulation and that “talents shall be employed by the county but work in township, leading hospitals of medical and health groups shall submit the talent demands and recruitment plan at the beginning of each year according to needs, and the county government is responsible for unified recruit, training, distribution and management of the medical workers (including doctors, pharmacists, nurses ,technicians and managers) needed by medical and health service groups.

The leading hospital of each group carries out whole post management to the medical technicians. The posts and staffing are fixed no matter the workers stay or leave. According to the principle of “setting up posts based on needs, employing workers based on posts, and workers fitting posts”, the limits among institutions, departments, and positions are broken down, and reasonable rotation, orderly flow and organized management are realized. The management model that all posts are officially budgeted posts, and they are reserved even when the medical work leaves is implemented.

Meanwhile, at the government level, in line with the principle of dynamic rotation, and unifying employees and budgeted posts, a “rotation pool” for the staffing shall be established in the health system of the whole county, which will facilitate the formation of a talent flow mechanism beneficial to the introduction and retention of talents and the downward flow of high quality medical resources. What’s more, the introduction of talents is not confined by official staffing recommendations any more, the worries of promoting the balanced downward flow of human resources are relieved, and advanced professional title promotion mechanism

is adopted. At the mechanism level, medical workers in higher level hospitals in the medical and health group must go to township health centers to carry out diagnosis and treatment service for at least one year before promotion.

Leading hospitals should give full play to their talent and specialty advantages, arrange attending physicians and other higher level technicians to offer guidance in member institutions regularly, and carry out ward round, discussions on particular cases and professional training. The group should also organize the medical workers of member institutions to carry out regular annual and graded talent training and professional training, so as to continuously improve the professional quality and service level of primary medical and health institutions.

5.2.3.2 Unify financial management

Under the condition that the county-level financial input channel and subsidy policy remain unchanged, each group shall implement the financial management method with “unified leadership and centralized management”.

Leading hospital of each group should set up a financial management center to ensure that the financial activities are managed centrally by the financial management center. Member institutions shall set up separate accounts, carry out independent accounting, and report to the financial center for approval.

All primary medical and health institutions will no longer set up accounting posts since a unified reporting system is established. Every month, the correspondent will report the financial condition, medical income and expenditure of the member institution to the leading hospital of the medical and health group, and the group’s management center will examine, approve, and execute the report. The accounting staff in primary medical and health institutions who do not have accounting certificates or have reached the retiring age should be switched to other posts and no longer engage in accounting.

A performance evaluation system shall be established. The leading hospital of the medical and health service group is responsible for perfecting the medical personnel appraisal plan in the group, and establishing a performance appraisal system suitable for the medical and health group. Performance evaluation should adhere to hospitals’ nature of serving the public good, and highlight such assessment indicators as overall duty performance, public health function implementation, medical service quality, medical cost control, operational performance evaluation and public satisfaction improvement. Performance evaluation results will be linked to the coefficient of financial subsidies payment, medical insurance balance allocation, and

total salary.

5.2.3.3 Unify resource and logistics support management

The leading hospital of the medical and health group shall, according to the different development conditions of primary medical and health institutions and the financial input at the county level, guide the primary medical and health institutions to invest in medical equipment purchasing, infrastructure construction and material procurement in a reasonable and orderly manner. The group carries out unified logistics management to all member institutions, and the assets are owned by primary medical and health institutions. The medical equipment purchasing and infrastructure construction in primary medical and health institutions, after the approval of the group, shall be submitted to the health administrative department after official consent.

Unified drug and consumable management. Under the premise of ensuring that the member units of medical and health service group are equipped with basic medicines and they are used in proportion conforming to the policy, for the medicines and consumables that the group's members need to purchase, the medical and health service group implements unified catalogue, negotiation, purchase, distribution and settlement. The advantages and functions of "purchasing with quantity" should be given full play in order to implement centralized bidding and joint procurement.

5.2.4 Improve supporting measures

5.2.4.1 Enhance informatization

A general platform for informatization should be set up to accelerate the service of "Internet plus intelligent medical care", strengthen management by means of information technologies, standardize medical behaviors and improve service quality. Network and information technologies should be applied to promote the cooperation of county and township medical and health institutions and build the connection between rural residents seeking medical treatment and experts in county hospitals. The model of "Internet plus medical and healthcare" should also be vigorously promoted to carry out distance education, health consultation, appointment referral, follow-up visit for chronic disease, guidance on scientific drug use, and eventually improve residents' self-management of health.

5.2.4.2 Set up strict assessment and supervision

County health administration and other departments shall strengthen fund supervision and medical behavior supervision to ensure the efficient operation of medical and health groups. Their functions and management methods should also change. To be specific, they should pre-allocate some health funds to the leading hospital in each quarter; relevant parties in the county shall formulate rules and regularly assess the performance of duties, and the implementation of duties of each medical and health group, and link the results with year-end settlement of medical insurance funds.

About 10% of the total medical insurance fund is taken out to set up a risk control fund, and 80% of the remaining fund (90% of the total) is assigned to the special accounts of medical and health groups according to the total quarterly budget. The rest 20% is regarded as the assessment fund and will be distributed at the end of the year.

5.2.4.3 Carry out contract service

Familiar doctor contract service team should be set up to carry out contract services across the county to implement the health service and management covering whole population, whole lifetime and whole cycle, thereby constructing a “safety net for people’s health”. Health lectures are held to popularize the basic knowledge and skills of health literacy to the public, and improve people’s health knowledge and awareness as well as self-care ability. Through the contract service and contract referral, orderly medical treatment and referral compliance is realized, which can improve the tier-by-tier referral system. The management and technical training of village doctors should also be strengthened to promote the integration of health care, rehabilitation and nursing.

5.2.4.4 Realize resource-sharing

By making use of the high quality medical equipment resources in leading hospitals, county disinfection supply center, ECG diagnosis center, clinical examination center, medical imaging center, pathological examination center and remote consultation center should be built, and the county and township medical institutions should connect with each other and recognize each other’s inspection and examination results so as to avoid unnecessary repeated tests, and reduce residents’ burden of seeking medical service. .

5.2.4.5 Standardize medical service behaviors

Standard prescriptions are supposed to be compiled and promoted in rural medical and health institutions. A clinical path management system for inpatient services, and a quality monitoring index system should be established and implemented. There should also be a reform of medical service process, so as to strengthen the cooperation among departments and among medical institutions at different levels. In this way, it can shorten waiting time, and reduce unnecessary waiting and repeated inspection.

5.2.4.6 Implement hierarchical diagnosis and treatment

According to the principle of hierarchical diagnosis and treatment, the project of “two downs and two ups” should be initiated, that is, downward flow of resources, and the improvement of the service ability of grass-root institutions as well as public satisfaction in medical treatment. More than 50 kinds of common diseases are selected by experts to be diagnosed and treated in primary medical and health institutions and reimbursement policy should be issued to guide patient to seek treatment in primary medical institutions for these diseases; County hospitals should give priority to patients transferred from village health centers (rooms), township health center and other primary medical and health institutions. After the patient’s condition is stable, the case should be transferred back to the primary medical and health institutions. And the higher level hospital will send the former attending doctors to primary medical and health institutions to guide the follow-up diagnosis and treatment. According to the statistics of Health Administrative Department of DC County, the model of “integrating county and township medical institutions into MHG+IBPMI” in DC county was planned and prepared during the period of 2017-2018. With the approval of the superior government of DC County, the ZK municipal people’s government, the model was officially initiated since October of 2018 with a trial term of one year. There will be an impact assessment by the end of 2019. If the result is consistent with previous expectation, the model will be kept; if not, further study will be needed. Currently, the model has been on trial for a year. The overall progressing has been smooth, and the evaluation result exceeds previous expectation.

5.3 Stakeholders involved in the Medical Treatment Combination Model

The stakeholders of the Medical Treatment Combination Model (MHG+IBPMI) in DC county’s medical reform include institutions and personnel.

5.3.1 Hospital

Hospitals include county hospitals, township hospitals and private hospitals, which involve all hospital staff: hospital leaders/managers (administrative staff), doctors, nurses (nursing staff), medical technicians and logistic staff. Main interests involved: number of patients, hospital income, income of hospital staff, staff motivation, social responsibility, medical quality of hospital, and development motivation of hospital.

5.3.2 Patient

Patients include outpatients and inpatients of county and township hospitals. Main interests involved: Patients' medical treatment experience, patient flow, reimbursement ratio of medical insurance and patient satisfaction.

5.3.3 Supplier

Suppliers include those providing drugs, consumables, medical devices and office supplies related to hospital operation. Main interests involved: hospital consumption of supplies, quality of supplies, supply prices, payback cycle, and after-sales service.

5.3.4 Government departments and officials

Government departments involved: the government and the healthcare department established within the government, the health administration department and the financial department. Main interests involved: division of functions and powers of the department, the realization of the goal and responsibility of government, the risk of payment of medical insurance funds in the medical insurance sector, the smooth operation of medical institutions and the development of healthcare undertakings, the financing and risk-taking of medical insurance in the financial sector.

The stakeholders involved in the Medical Treatment Combination Model in DC County's medical reform are summarized in Table 5.1.

The Impact of the Medical Treatment Combination Model on Stakeholders and Patient Flow
in a Chinese County

Table 5.1 Stakeholders involved in the Medical Treatment Combination Model in DC County's medical reform

		Stakeholders	Interests involved
1	Hospitals	<p>Institutions: (1) County hospitals (2) Township hospitals (3) Private hospitals</p> <p>Personnel: (1) Leaders/managers (2) Doctors (3) Nursing staff (4) Medical technicians (5) Logistic staff</p>	<p>Number of patients, hospital income, social responsibility, medical quality of hospital, patient safety, doctor-patient relationship, development motivation of hospital</p> <p>Development of medical institution, patient safety, income of hospital staff, staff motivation, improvement of medical quality, personal development of medical technicians, service awareness and service modes, workload</p>
2	Patients	<p>(1) Outpatients (2) Inpatients</p>	<p>Patients' medical treatment experience, patient flow, reimbursement ratio of medical insurance (financial burden on patients) and patient satisfaction.</p>
3	Providers	<p>Institutions: (1) Drug suppliers (2) Consumable suppliers (3) Medical device suppliers (4) Office supplies providers</p> <p>Personnel: (1) Regional managers (2) Sales representatives (3) After-sales staff</p>	<p>Hospital consumption of drug and consumable supplies, hospital's motivation to add or update medical devices, quality of supplies, supply prices, payback cycle, after-sales service, and profits</p> <p>Sales, individual's income, sales target and method, customer communication, and the accessibility of after-sales service</p>
4	Government departments	<p>Institutions: (1) Government (2) Healthcare department (3) Healthcare security administration (4) Financial department</p> <p>Personnel: (1) Leaders/managers (2) Staff</p>	<p>Division of functions and powers of the department, the realization of the goal and responsibility of government, the risk of payment of medical insurance funds in the medical insurance department, the smooth operation of medical institutions, the development of healthcare undertakings, the financing and risk-taking of medical insurance in the financial department.</p> <p>Division of individual's power, social status, sense of achievement in work, discourse power within the government</p>

5.4 The impact of the Medical Treatment Combination Model on stakeholders

This thesis investigated through interviews and questionnaires with the stakeholders of the Medical Treatment Combination Model (MHG+IBPMI) to sum up its impact on stakeholders such as medical institutions, medical workers, patients, suppliers, and government officials. All the relevant data in this chapter are collected from the direct reporting system of the health network in DC County and the internal statistics of the healthcare security administration.

5.4.1 The impact on medical insurance funds

Figure 5.1 shows the collection and payment of local health insurance funds from 2015 to 2017, from which we can see that the financial risk of health insurance funds in DC County is increasingly prominent, reaching a collapse as shown in Figure 5.1.

The trial operation of the Medical Treatment Combination Model began since October of 2018. The cost reduction effect started to show, the payment/collection ratio in that year declined to less than 100%, and the surplus of health insurance funds reached over 10 million yuan. The year 2019 and 2020 marked the full implementation of the medical and health group model. Thereafter, the effect of cost reduction became more obvious. The payment/collection ratio was about less than 90%, and net surplus was up to over 120 million yuan. Eventually, the payment of healthcare funds shifted from overrun to surplus, and the danger of a collapse was avoided, as shown in Table 5.2.

Table 5.2 and Figure 5.2 also show that the financing of medical insurance continued to increase from 2015 to 2020. Even though affected by the Covid-19 pandemic in 2020, the financing of medical insurance was still on the rise. After the implementation of the Medical Treatment Combination Model in October 2018, the surge in medical insurance funds payments was apparently curbed.

The Impact of the Medical Treatment Combination Model on Stakeholders and Patient Flow in a Chinese County

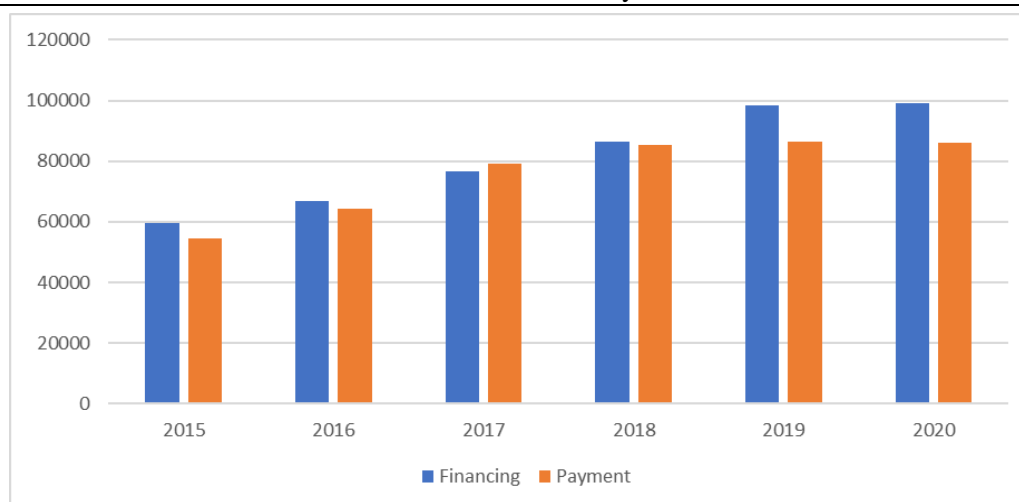


Figure 5.1 Collection and payment of health insurance funds from 2015 to 2020

Source: Medical Security Bureau of DC County (2020)

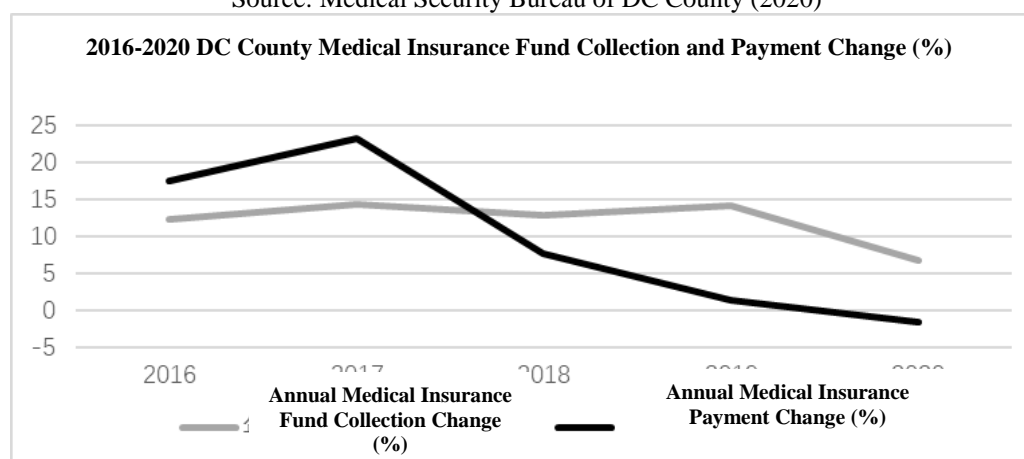


Figure 5.2 2016-2020 DC County medical insurance fund collection and payment change (%)

Note: “+” means increase; “-” means decrease; the Medical Treatment Combination Model has been implemented since October 2018.

Source: Medical Security Bureau of DC County (2020)

Table 5.2 Medical insurance fund collection and payment in DC County from 2015 to 2020

	Medical insurance fund collection		Medical insurance fund payment		Payment/Collection Ratio (%)	overspend (-) / surplus (+) (10,000 yuan)
	Collection** (10,000 yuan)	Compared with last year* (%)	Payment** (10,000 yuan)	Compared with last year* (%)		
2015	59,632	—	54,694	—	91.7	+4,938
2016	66,925	+12.23	64,250	+17.47	96.0	+2,674
2017	76,474	+14.27	79,185	+23.25	103.5	-2,711
2018***	86,333	+12.89	85,313	+7.74	98.8	+1,020
2019	98,481	+14.07	86,387	+1.26	87.7	+12,094

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2020	99,144	+6.73	84,947	-1.67	85.7	+14,197
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Note: * The percentage change compared with last year (%) equals the value of the current year-the value of the previous year divided by the value of the previous year; “+” means increase or surplus; “-” means decrease or overspend; ***The Medical Treatment Combination Model has been implemented since October, 2018.

Source: Medical Security Bureau of DC County (2020)

5.4.2 The impact on medical institutions

In terms of the impact on medical institutions, this study selects the four levels of medical institution, namely county hospitals, township health centers, private hospitals and public health service institutions involved in the Medical Treatment Combination Model.

5.4.2.1 The impact on county hospitals

After the Medical Treatment Combination Model was implemented, medical institutions in DC County have taken various measures, such as selecting core talents to study in higher level hospitals, further perfecting the setting of specialty departments, purchasing advanced equipment, and establishing remote consultation approaches, to raise the level of medical services and attract patients to stay in the county for treatment. According to the statistics of DC County health administrative department, the proportion of Grade-3 and -4 surgeries in county hospitals has been increasing, from less than 40% in 2015 and 2016, to less than 45% in 2017 and 2018, then to over 50% in 2019 and 2020. It shows that the level of medical service, diagnosis and treatment in county hospitals has been greatly improved in a short period of time, and the development potential of medical institutions has been strengthened (Table 5.2).

5.4.2.1.1 Analysis from the perspective of medical institutions’ social responsibility

The Medical Treatment Combination Model realized the “integration of county and township medical institutions plus integrated bundled payment of medical insurance”. Therefore, medical institutions no longer want more patients, but hope residents in the area keep healthy and away from illness. The principle of diagnosis and treatment is to spend as little money as possible, so the nature of medical institutions has shifted from profiting to public welfare, that is, letting medical institutions return to the field of public welfare.

5.4.2.1.2 Analysis from the perspective of average hospital stay of discharged patients

According to the statistics of DC County’s health administrative department, the average length of county-level hospital stay decreased in 2019 and 2020. The proportion of Grade-3 and -4 surgeries in county hospitals increases while hospital stay was reduced, indicating the

improvement of medical technology level and service efficiency in county hospitals (Figure 5.3).

5.4.2.1.3 Analysis from the financial perspective

Table 5.3 shows that after the implementation of the Medical Treatment Combination Model in October 2018, the financial (medical insurance) income of county-level hospitals has increased year by year. Although affected by the Covid-19 pandemic in 2020, the number of patients in county-level hospitals has decreased significantly (>10%), but due to the improvement of medical standards (for example, the proportion of Grade-3 and Grade-4 surgeries increases), financial (medical insurance) income still shows a rise (>5%). This analysis may be also observed in Figure 5.3.

Table 5.3 Medical and financial indicators of county hospitals in DC county from 2015 to 2020

No.	Number of admissions		Average length of stay		Percentage of Grade-3 and Grade-4 surgeries		Average cost per inpatient		Financial (medical insurance) income	
	No.	Percent age change compared with last year* (%)	No. of days	Percenta ge change compare d with last year* (%)	Percentag e (%)	Percentag e change compared with last year* (%)	Expense s (yuan)	Percenta ge change compare d with last year* (%)	Income (10,000 yuan)	Percentag e change compared with last year* (%)
2015	75,812	—	8.2	—	35.9	—	4,538	—	20,641	—
2016	81,680	+7.74	8.4	+2.44	39.5	+10.03	4,660	+2.69	22,837	+10.64
2017	83,663	+2.43	8.6	+2.38	41.5	+5.06	5,227	+12.17	26,237	+14.89
2018**	89,668	+7.18	8.8	+2.33	43.7	+5.30	5,692	+8.90	28,069	+6.98
2019	94,590	+5.49	8.6	-2.27	51.6	+18.08	6,147	+7.99	37,793	+34.64
2020	83,684	-11.53	8.3	-3.49	54.1	+4.84	6,339	+3.12	39,787	+5.28

Note: * The percentage change compared with last year (%) equals the value of the current year-the value of the previous year divided by the value of the previous year; "+" means increase or surplus; "-" means decrease or overspend; **The Medical Treatment Combination Model was first implemented in October, 2018.

Source: Medical Security Bureau of DC County (2020)

5.4.2.1.4 Analysis from the perspective of the total number of patients

According to the statistics of the DC County's health administration department, after the implementation of the Medical Treatment Combination Model in October 2018, the growth rate of patients outside the county has significantly decreased, while the number of patients in township hospitals has increased significantly. It shows that the number of patients in medical institutions in the county has returned to a large extent, and the loyalty of patients in hospitals

The Impact of the Medical Treatment Combination Model on Stakeholders and Patient Flow
in a Chinese County

has been improved. Affected by the Covid-19 pandemic in 2020, the number of patients visiting hospitals declined (including county-level hospitals), yet the number of patients visiting township healthcare centers still increased slightly (>3%) (see Table 5.4, Figure 5.3, Annex C Figure C.2 and Figure C.3).

Table 5.4 Patients' flow of DC County from 2015 to 2020

	Patients treated outside the county area		Patients treated within the county area					
			County-level hospitals		Township healthcare centers		Private hospitals	
	No.	Percentage change compared with last year* (%)	No.	Percentage change compared with last year* (%)	No.	Percentage change compared with last year* (%)	No.	Percentage change compared with last year* (%)
2015	21,802	—	75,812	—	25,496	—	19,506	—
2016	25,518	+17.04	81,680	+7.74	22,991	-9.83	20,089	+2.99
2017	23,720	-7.05	83,663	+2.43	27,387	+19.12	27,968	+39.22
2018**	29,080	+22.60	89,668	+7.18	27,355	-0.12	30,584	+9.35
2019	32,842	+12.94	94,590	+5.49	38,769	+41.73	27,023	-11.64
2020	30,324	-7.67	83,684	-11.53	39,979	+3.12	26,647	-1.39

Note: * The percentage change compared with last year (%) equals the value of the current year-the value of the previous year divided by the value of the previous year; "+" means increase or surplus; "-" means decrease or overspend; **The Medical Treatment Combination Model was first implemented in October, 2018.

Source: Medical Security Bureau of DC County (2020)

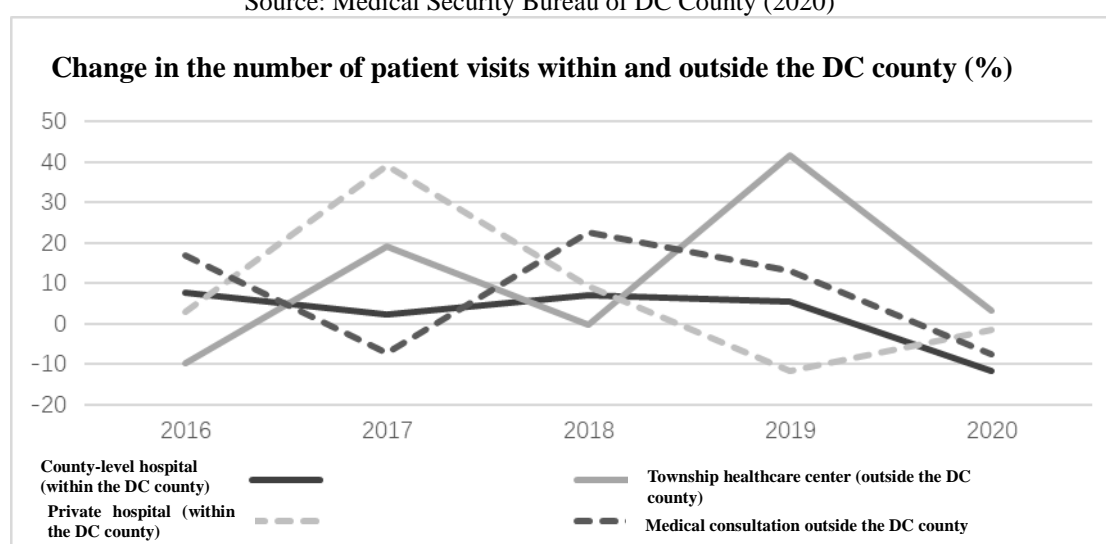


Figure 5.3 The percentage change in the number of patient visits within and outside the DC county from 2015 to 2020 (%)

Note: *In Figure 5.3, "+" means increase; "-" means decrease; the Medical Treatment Combination Model has been implemented since October 2018.

Source: Medical Security Bureau of DC County (2020)

5.4.2.2 The impact on township healthcare centers

5.4.2.2.1 Analysis from the perspective of the financial income of township healthcare centers

According to the statistics of the health administration department of DC County: The financial (medical insurance) income of township healthcare centers was low from 2015 to 2018, of which 2018 hit the lowest (<37 million yuan), indicating the poor operation of township hospitals. The new Medical Treatment Combination Model was first implemented in October 2018, with the number of patients increasing in 2019, indicating that patients returned to township hospitals, and financial (medical insurance) income improved significantly. Despite the impact of the Covid-19 pandemic in 2020, the number of admitted patients and financial (medical insurance) income in township healthcare centers still slightly increased. Meanwhile, the average hospitalization cost of patients has been decreasing year by year (Table 5.4).

Table 5.5 Medical and Financial Indicators of Township Healthcare Center in DC County from 2015 to 2020

	Inpatients		Average cost per inpatient		Financial (medical insurance) income	
	No.	Percentage change compared with last year* (%)	Expenses (yuan)	Percentage change compared with last year* (%)	Income (10,000 yuan)	Percentage change compared with last year* (%)
2015	25,496	—	2,006	—	3,836	—
2016	22,991	-9.83	2,125	+5.93	3,664	-4.48
2017	27,387	+19.12	1,900	-10.59	3,902	+6.50
2018**	27,355	-0.12	1,890	-0.53	3,618	-7.28
2019	38,769	+41.73	1,801	-4.71	5,586	+54.39
2020	39,979	+3.12	1,669	-7.33	6,005	+7.50

Note: * The percentage change compared with last year (%) equals the value of the current year-the value of the previous year divided by the value of the previous year; “+” means increase or surplus; “-” means decrease or overspend; **The Medical Treatment Combination Model was first implemented in October, 2018.

Source: Medical Security Bureau of DC County (2020)

5.4.2.2.2 Analysis from the perspective of the average cost per inpatient

After the implementation of the new Medical Treatment Combination Model in October of 2018, the average cost per inpatient has been reduced year by year, reducing the economic burden of patients for medical treatment, and increasing their satisfaction and loyalty in

township healthcare centers (Table 5.5, Figure 5.4).

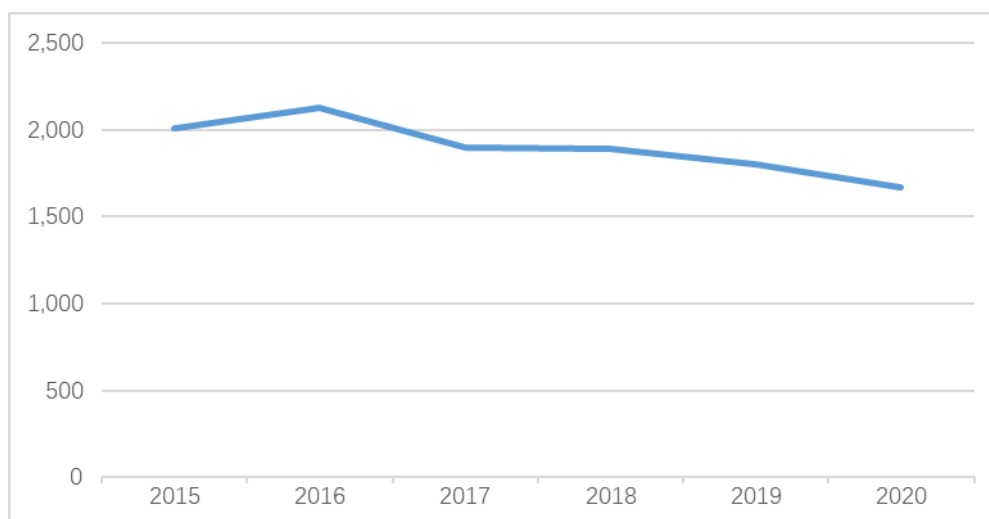


Figure 5.4 Average cost per inpatient of township healthcare centers in DC County from 2015 to 2020

Source: Medical Security Bureau of DC County (2020)

5.4.2.2.3 Analysis from the perspective of the patient's experience of medical treatment

After the implementation of the new Medical Treatment Combination Model, the group of medical institutions has implemented homogeneous diagnosis and treatment services to township healthcare centers through selecting and sending experts as well as technical support such as remote ECG centers and testing centers, so that rural patients can enjoy the diagnosis and treatment services of county hospitals in nearby healthcare centers, and the patients' experience in medical treatment can be improved. According to the statistical yearbook of the county health committee, the average hospital stay of public hospitals were 9.48 days in 2018 and 9.08 days in 2019 (0.4 days less than 2018). This is a very big progress, which can effectively reduce the financial cost of patients, make the effect of medical treatment more obvious, and improve patients' experience in medical treatment (Health Committee of DC County, 2019).

5.4.2.2.4 Analysis from the perspective of the development of township healthcare centers

After the implementation of the new Medical Treatment Combination Model, the medical and health group has promoted the overall service quality and level of township healthcare centers, as well as their appeal and patient loyalty by means of teaching and training the medical staff of township healthcare centers, selecting talents to study in higher level hospitals, and investing in the hardware facilities of township healthcare centers. Driven by the rules that "jobs and staffing shall be applied in township under county regulation" and that "talents shall

be employed by the county but work in township”, grass-root township healthcare centers have become more and more attractive for medical workers, which will benefit their own talent reserve and overall development. In 2019, the county’s township healthcare centers added 46 new medical devices, a 360% increase compared to 10 in 2018; a total of 40 professional technicians with college degree were introduced, a 700% increase compared to 5 in 2018; there were also 12 with bachelor degree, and 3 with master degree (or post-graduate qualification)-a breakthrough from zero; 345 medical workers in township healthcare centers were sent to study in higher level hospitals, a 137.93% increase compared to 145 in the previous year. Doctors in county hospitals were sent to township healthcare centers for 18630 times, also a breakthrough from zero. (Data are collected from the health statistics system of DC County)

5.4.2.3 Influence on private hospitals

After the implementation of the new Medical Treatment Combination Model, medical group members, together with government healthcare administrations and medical insurance sectors, take a variety of measures to regulate medical treatment, especially strict about over-testing, over-treatment and over-prescription, in medical institutions within the jurisdiction area. In addition, public hospitals improve medical service quality and reduce costs, making a significant impact on the operating indicators of private hospitals (Table 5.6).

5.4.2.3.1 Analysis of medical insurance income

The financial (medical insurance) income of private hospitals shows that after the implementation of the Medical Treatment Combination Model in October 2018, the medical insurance income has risen compared to the previous period and is relatively stable. Even with the impact of the Covid-19 pandemic in 2020, the financial (medical insurance) income of private hospitals still registered a slight rise (Table 5.6).

5.4.2.3.2 Analysis of average hospitalization expenses and the number of inpatients

After the implementation of the Medical Treatment Combination Model in October 2018, the increase in per capita hospitalization expenses for inpatients in private hospitals has been effectively curbed. The burden of medical care for patients has decreased while the attractiveness to patients has increased. Affected by the Covid-19 pandemic in 2020, the number of inpatients in private hospitals has decreased slightly (<2%) (Table 5.6).

The implementation of the Medical Treatment Combination Model urges private hospitals to change their business model with a shift from a purely profit-seeking approach to a

standardized path of better services and professional treatment. Private hospitals need to share the common goal with their public counterparts: residents' health. As long as residents become less sick and stay healthy, medical institutions can "maximize their profits".

Table 5.6 Private hospitals' medical and financial indicators of DC County 2015-2020

	Inpatients		Per capita expenses of inpatients		Financial (medical insurance) income	
	No.	Percentage change compared with last year* (%)	Cost (yuan)	Percentage change compared with last year* (%)	Income (10,000 yuan)	Percentage change compared with last year* (%)
2015	19,506	—	2,420	—	2,832	—
2016	20,089	+2.99	2,622	+8.35	3,160	+11.58
2017	27,968	+39.22	3,250	+23.95	5,454	+72.59
2018**	30,584	+9.35	4,115	+26.62	6,922	+26.92
2019	27,023	-11.64	4,105	-0.24	7,210	+4.16
2020	26,647	-1.39	3,811	-7.16	7,616	+5.63

Note: * The percentage change compared with last year (%) equals the value of the current year-the value of the previous year divided by the value of the previous year; "+" means increase or surplus; "-" means decrease or overspend; **The Medical Treatment Combination Model was first implemented in October, 2018.

Source: Medical Security Bureau of DC County (2020)

5.4.2.4 Influence on public healthcare institutions

The Medical Treatment Combination Model (MHG+IBPMI) unifies the pursuits of both medical institutions and patients. For patients, they want to be healthy so as to incur fewer medical expenses and live a better life; for medical institutions, they hope patients stay healthy so that fewer insurance funds will be spent. Their common pursuit coincides with the purpose of public healthcare institutions. In actual operation, professionals in disease prevention and control and maternal and child healthcare are selected by the health administrative department as the deputies of medical and health groups. Their task is to follow up on the implementation of disease prevention and control, as well as the healthcare services for women and children. Disease prevention and control makes residents less vulnerable to diseases, and therefore reduces the payment of medical insurance and saves insurance funds for medical and health groups. In turn, these groups are willing to provide financial and technical support for improving residents' health through various measures such as health education, disease screening, health knowledge manuals, and health intervention for high-risk groups. Those measures effectively support the work of public healthcare institutions in disease prevention and control and the healthcare services for women and children.

Questionnaire surveys and interviews show that the work of public healthcare institutions in disease prevention and control and maternal and child healthcare has been strengthened and promoted by such measures.

Especially in the prevention and control of the COVID-19 pandemic in 2020, institutions in medical and health groups took advantage of their integration of personnel, funds and materials. With the capability to flexibly deploy anti-pandemic supplies, they provided timely support for disease prevention and control and helped fight against the pandemic. Their efficiency of material and personnel deployment tops the city and the province, which wins recognition from superior authorities.

5.4.3 Influence on medical workers

Medical workers are the main part of a medical and health group. In this study about the influence on medical workers, managers, doctors, nurses, medical technicians and logistics personnel are selected for interviews.

5.4.3.1 Influence on hospital managers

The analysis of the influence on hospital managers is as follows.

5.4.3.1.1 Broader vision and greater responsibility

Under the Medical Treatment Combination Model (MHG+IBPMI), township healthcare centers are integrated into the medical and health groups led by county hospitals. In this way, the management scope of county medical institutions is expanded, going beyond the hospitals as before. For a brand-new operating model in the history of DC County and HN Province, hospital managers cannot learn from mature experience but have to keep learning. Under the new model, they need to continuously broaden their horizons and assume the responsibility to manage the medical and health groups.

5.4.3.1.2 Strengthened global consciousness

The Medical Treatment Combination Model (MHG+IBPMI) in DC County is implemented by four medical and health groups. The government and the health administrative department of DC County have put forward clear requirements for each medical and health group: only when all the groups achieve the desired effects can the new model be considered successful. This requires higher global consciousness among managers in every medical and health group. And for managers of group members, they should take new responsibilities in group operation, the rational use and security of medical insurance funds and the long-term health of patients.

Given all that, the new model enhances the global consciousness of hospital managers.

5.4.3.1.3 Changes in operational concept

The Medical Treatment Combination Model (MHG+IBPMI) brings about a shift in the evaluation criteria among managers. They take the security of medical insurance funds, the safety of patients and the reduced operational cost as their goals, and regard effective treatment, lower prevalence rate and clinical medical cost as primary criteria, instead of income. This requires for a conceptual change among managers.

5.4.3.2 Influence on doctors

The analysis of the influence on doctors in hospitals of different levels is as follows.

Analysis of doctors in township healthcare centers: Under the new model, doctors in township healthcare centers have more access to further study in higher-level hospitals, which is conducive to the improvement of their professional ability. Experts from higher-level hospitals provide medical services in township healthcare centers, so that more patients will choose to receive treatment there, which will increase the number of cases and enrich the disease types handled by township doctors, as well as their income. Furthermore, thanks to the development of information technology, technical support such as remote medical consultation and electrocardiogram (ECG) diagnosis centers helps doctors in township healthcare centers avoid medical errors, increase diagnosis rate, and reduce risks. Arranged by the medical and health group, township doctors should undertake tasks such as health education, disease screening and health intervention in rural areas and communities, which will strengthen the relationship with rural and community residents and add to their workload.

5.4.3.2.1 Analysis of doctors in county-level hospitals

Under the new model, there is a decline in the common types of disease and a rise in the intractable types among patients admitted by county-level hospitals. Such cases of difficult diagnosis and treatment improve the specialist skills of doctors. In addition to the treatment of critically ill patients at the headquarters, doctors are arranged to work shifts in township healthcare centers for consultation, ward rounds and other work. The more patients they provide services for, the more influential they will be. Meanwhile, they take on more work.

5.4.3.2.2 Analysis of doctors in township hospitals

It is convenient for doctors in township hospitals to go to higher-level hospitals for further study to improve their medical skills under the new model. Experts from superior hospitals

can visit township hospitals for medical treatment to increase patients' stay, which is beneficial to doctors there to touch more patients and diseases, and thus to increase their incomes. With the popularization of information technology, remote consultation, ECG center and other technical support can help doctors in township hospitals to reduce errors in diagnosis and treatment, improve the diagnosis rate and reduce risks. Under the unified organization of the health group, township hospitals also undertake the tasks of health education, disease screening, health intervention and other tasks in rural communities, which is conducive to strengthening the connection with rural and community residents, and at the same time, the volume of work has increased.

5.4.3.2.3 Analysis of regulating medical treatment

The Medical Treatment Combination Model (MHG+IBPMI) puts forward stricter requirements at the management level for doctors to carry out treatment. Medical and health groups restrict and regulate doctors' medical behaviors with such measures as DRG and single disease payment. Doctors at all levels must comply with the requirements for necessary, reasonable, and lower medical costs. All doctors must take the major shift from providing treatment without scruples to saving as much as medical costs while ensuring effective treatment.

5.4.3.3 Influence on nursing staff

The analysis of the influence on nursing staff in hospitals of different levels is as follows.

5.4.3.3.1 Analysis from nursing staff in county-level hospitals

Under the Medical Treatment Combination Model (MHG+IBPMI) and the combined effect of multiple policies and measures, county-level hospitals see a decline in the common types of disease and a rise in the intractable types among patients admitted. This increases the requirement for comprehensive nursing skills which can promote specialist nursing standards and accordingly raise the income of nursing staff. Through assistance and support to the grassroots medical institutions, nursing staff in county-level hospitals have a higher sense of accomplishment and responsibility and a better understanding of grassroots patients, which is of positive significance to nurse-patient communication.

5.4.3.3.2 Analysis from nursing staff in township healthcare centers

Under the Medical Treatment Combination Model (MHG+IBPMI) and the combined effect of policies and measures, some patients in recovery are referred from county-level hospitals to

township healthcare centers, and meanwhile more people choose township healthcare centers for treatment. The rapid increase in patient visits brings many challenges and opportunities to nurses who therefore need to improve their nursing ability as soon as possible. At the same time, the increased patient number leads to a rise in nurses' salaries as an incentive in township healthcare centers, according to the current pay scheme for nursing staff in medical institutions of DC County.

5.4.3.4 Influence on medical technicians

The Medical Treatment Combination Model (MHG+IBPMI), together with a variety of policy measures, influences medical technicians in hospitals at different levels mainly in the following aspects:

5.4.3.4.1 Standardized auxiliary examinations

Hospitals adopt stricter and more detailed standards for examinations with tighter supervision on the reasons for examinations at all levels. In this case, unnecessary health examinations have been greatly reduced, and the workload has been eased accordingly.

5.4.3.4.2 Resource sharing

The medical and health group encourages hospitals and member institutions to share resources. In the sharing, inspections and clinical consultations increase, the positive rate of auxiliary examinations is greatly improved, and the sense of accomplishment is enhanced among medical technicians.

5.4.3.4.3 Change in income structure

After the adjustment of performance distribution principles and the salary system reform of hospitals, the income structure of medical technicians has changed significantly. As they no longer rely solely on billing inspections to obtain income, the original profit-seeking nature has been reversed.

5.4.3.4.4 Improved skills

The medical and health group provides medical technicians in township healthcare centers with an accessible platform for further study and communication with their counterparts in higher-level hospitals, which helps improve the skills of medical technicians in the institutions of grassroots level.

5.4.3.4.5 Accelerated growth of talents

The back-flow of patients, as well as the implementation of hierarchical diagnosis and treatment and two-way referral, leads to a rise in the proportion of difficult disease checks in county-level hospitals, posing a challenge to medical technicians and meanwhile accelerating their growth by improving their diagnosis and treatment skills.

5.4.3.4.6 Academic exchanges

Medical technicians and clinicians have closer exchanges, especially in discussing difficult diseases and making plans for diagnosis and treatment. Through interaction, they can develop a better sense of teamwork which contributes to academic exchanges and diagnosis and treatment security.

5.4.3.5 Influence on hospital logistics workers

As an important part of the medical and health group, hospital logistics personnel are indispensable to the normal operation of the Medical Treatment Combination Model (MHG+IBPMI). The impact of the Model (MHG+IBPMI) on hospital logistics personnel is mainly reflected in the following aspects:

5.4.3.5.1 Integrated resources and extra workload

Under the Medical Treatment Combination Model (MGH+IBPMI), each medical and health group has integrated the logistics business within the group, so the duty of logistics staff will be to guarantee the smooth operation of all the medical institutions within the group, not just the original hospitals. Besides, medical and health groups also let some logistics personnel join the health education organizations to carry out supervision, health promotion and family doctor contracting services. This has increased both their workload and the utilization of logistics resources.

5.4.3.5.2 Enhanced sense of service

Under the Medical Treatment Combination Model (MGH+IBPMI), the health of residents has become the goal of medical and health groups. To achieve this goal, the groups must take measures such as cost cut and health intervention, which requires for a better sense of service among logistics staff. With residents' health as the general goal, logistics staff in practice should focus on clinical patients, therefore enhancing their sense of service.

5.4.3.5.3 Increased salary

According to the general salary scheme, the salary package of logistics staff is linked to the income or performance of medical institutions. With the implementation of the Medical Treatment Combination Model (MGH+IBPMI), 2019 witnessed an improved financial situation, much better than that in 2018. That means the salary of logistics staff has also been increased, which can greatly motivate them.

5.4.4 Influence on patients

Patients are the most direct and closest stakeholders of the Medical Treatment Combination Model (MGH+IBPMI) which in turn has the greatest and most direct impact on patients. Analyzing the impact of the Model on patients is the most critical way to evaluate the effect of this new model.

5.4.4.1 Influence on the direction of patients' flow in seeking treatment

5.4.4.1.1 Analysis of the number of visits beyond the county

Many patients in DC County choose to seek medical treatment outside the county, with a gradual increase from 2015 to 2018. After the implementation of the Medical Treatment Combination Model (MHG+IBPMI), the diagnosis and treatment capabilities and service levels of medical institutions in the county have been improved, and the attractiveness to patients has been significantly enhanced. Although there is still an increasing number of patients seeking medical care outside the county, the increase has seen a slowdown. Especially affected by the Covid-19 pandemic in 2020, many patients realize that it is more convenient to seek medical treatment nearby (Table 5.4, Figure 5.3).

5.4.4.1.2 Analysis of the number of visits in county-level hospitals

After the implementation of the Medical Treatment Combination Model (MHG+IBPMI), the medical level of county-level hospitals has been improved, patients who originally sought medical care outside the county area have returned significantly, and the number of visits in county-level hospitals has been on the rise. Yet, due to the impact of the Covid-19 pandemic in 2020, county-level hospitals saw a decline of patients in 2020 (Table 5.4, Figure 5.3).

5.4.4.1.3 Analysis of the number of visits in township hospitals

After the implementation of the medical community operation model (MHG+IBPMI), the number of visits to township health centers has increased significantly. Even if affected by the

Covid-19 pandemic in 2020, the number of visits has also increased slightly. It is suggested that the number of patients in the county has returned to the medical institutions within the county to a large extent, especially to the primary medical institutions like township health centers (Table 5.4, Figure 5.3).

5.4.4.1.4 Analysis from the perspective of two-way referral

The first is the patient flow at grassroots level. After the implementation of the Medical Treatment Combination Model (MGH+IBPMI), the medical and health groups, based on the principle of high efficiency and low cost, diverted their patients according to the type and course of the disease. After the diagnosis and treatment plans were completed, most of the patients with common, frequently-occurring and mild diseases were transferred to township healthcare centers and community-level hospitals for treatment; those with severe, acute and difficult diseases were transferred to county-level hospitals for treatment after initial diagnosis in grassroots medical institutions. The second is patient flow to the county. For some patients with difficult diseases who originally visited medical institutions outside the county, the medical and health groups have strengthened the construction of provincial and municipal key specialties and launched specialties alliances with tertiary A hospitals inside and outside the province. Thanks to the significantly improved comprehensive medical strength in the county, patients with major illnesses no longer need to seek treatment outside the county. Instead, they can receive treatment in county-level hospitals under safe conditions, as experts are invited there for diagnosis and treatment, operation and consultation. Therefore, the number of patients referred outwards decreases. In 2019, the outward referral rate of the county dropped by 57.56% year-on-year (Health Committee of DC County, 2019).

5.4.4.2 Influence on patients' expenses

Table 5.7 shows that from 2015 to 2020, the per capita hospitalization expenses of inpatients outside the county have increased year by year. Although the growth rate has decreased in 2019-2020, it is still on the rise. At the same time, the overall per capita hospitalization expenses of inpatients in the county area stabilized, especially after the implementation of the Medical Treatment Combination Model in October 2018, the increase in the overall per capita hospitalization expenses of inpatients within the county area was controlled to <4% per year, and the upward trend was curbed. Table 5.7 also shows that after the implementation of the Medical Treatment Combination Model, the increase in per capita hospitalization expenses of inpatients in county-level hospitals has been significantly reduced, and that in township

healthcare centers and private hospitals have shown negative growth.

Overall, the per capita hospitalization expenses of inpatients in medical institutions in the county are on a downward trend. The medical expenses of patients have been controlled, the burden of medical care has been reduced, and the problem of “expensive medical care” has been reversed (Table 5.7, Annex C Figure C.4 and Figure C.5).

Table 5.7 Change of per capita hospitalization expenses for patients in DC County from 2015 to 2020

	Average hospitalization expenses for patients outside the county		Within the county (In total)		County-level hospitals		Township healthcare centers		Private hospitals	
	Expenses (yuan)	Percentage change compared with last year* (%)	Expenses (yuan)	Percentage change compared with last year* (%)	Expenses (yuan)	Percentage change compared with last year* (%)	Expenses (yuan)	Percentage change compared with last year* (%)	Expenses (yuan)	Percentage change compared with last year* (%)
2015	13,165	—	3,446	—	4,538	—	2,006	—	2,420	—
2016	14,284	+8.50	3,589	+4.14	4,660	+2.69	2,125	+5.93	2,622	+8.35
2017	16,170	+13.20	3,895	+8.55	5,227	+12.17	1,900	+10.59	3,250	+23.95
2018**	17,993	+11.27	4,112	+5.56	5,692	+8.90	1,890	-0.53	4,115	+26.62
2019	18,246	+1.41	4,266	+3.75	6,147	+7.99	1,801	-4.71	4,105	-0.24
2020	18,686	+2.41	4,420	+3.61	6,339	+3.12	1,669	-7.33	3,811	-7.16

Note: Change compared with the previous year (%) = (current year’s value-previous year’s value)/previous year’s value; “+” means increase;

Source: Medical Security Bureau of DC County (2020)

As time goes by, health intervention will gradually take effect. Public health services such as health screening and health check-ups have taken diseases under intervention before their outbreak, reducing the probability of patients suffering from serious illnesses and thus alleviating the burden of disease treatment. Instead, health education promotes healthy lifestyles among residents which helps them avoid getting sick and thus reduces their medical burden.

5.4.4.3 Influence on treatment experience of patients

The analysis of the influence on treatment experience is as follows.

5.4.4.3.1 Increased satisfaction about medical services

The Medical Treatment Combination Model (MGH+IBPMI) allows the county and the

township to share their medical resources, and makes possible the integrated and homogeneous services in township healthcare centers and county-level hospitals. This helps increase the satisfaction of patients who seek treatment in township healthcare centers. For patients who need to go to county-level hospitals, appointments can be made in township healthcare centers, so they can enjoy the convenient “green channel” when they visit county-level hospitals without registration, queuing or waiting. For other patients who need to see experts of higher-level hospitals, through business integration, such experts can be invited to the county-level hospitals for diagnosis and treatment. In this case, patients do not have to be referred to higher-level hospitals and can receive the desired treatment in county-level hospitals, which reduces their transportation and accommodation costs and thus increases their satisfaction. According to the data of satisfaction from the satisfaction management platform of national public hospitals, from 2018 to 2020, the satisfaction degree of public hospitals in DC County has increased (Table 5.8).

Table 5.8 Satisfaction survey data of public hospitals in DC County

	Satisfaction degree (%)		
	Hospital staff	Outpatients	Inpatients
2018	98.0	96.0	95.0
2019	98.5	97.0	97.5
2020	99.7	98.6	99.2

Source: National Health Commission of the PRC (2019)

5.4.4.3.2 Significantly improved doctor-patient relationship

In the past, hospitals obtained benefits from check-ups, inspections and treatments of patients. To this end, hospitals and doctors tried their best to persuade patients to do more check-ups, inspections and treatments, and made them pay more. In that case, doctors and patients were inevitably in a state of hostility with continued disputes and conflicts, and even the outbreak of violence towards medical staff. According to the satisfaction survey data of public hospitals in DC County, it can be concluded that a series of health intervention measures such as disease screening and health check-ups have made residents regard medical institutions as their health allies, which improves the doctor-patient relationship in which both parties pursue the goal of health. This is a very exciting trend.

5.4.4.3.3 Better medical skills and enhanced patient safety

Under the Medical Treatment Combination Model (MGH+IBPMI), each medical and health

group arranges experts from county-level hospitals to take turns to provide medical services in township healthcare centers and gives further-study opportunities to doctors and nurses in township healthcare centers. In addition, the group also takes some means of information technology including telemedicine and teleconsultation to homogenize the diagnosis and treatment level of township healthcare centers and county-level hospitals. County-level hospitals also improve their medical capabilities by selecting outstanding doctors for further studies, inviting experts for training, recruiting talents, and upgrading medical technology equipment. The improvement of the diagnosis and treatment skills of both county-level hospitals and township healthcare centers has effectively guaranteed the safety of patients.

5.4.5 Influence on suppliers

Suppliers ensure the supplies for normal operation of all hospitals. As medical institutions change their operational model, suppliers will be influenced accordingly. In the interviews, this study selected suppliers from three areas closely related to hospitals: medicines, consumables and medical equipment.

5.4.5.1 Influence on medicine suppliers

The implementation of the Medical Treatment Combination Model (MGH+IBPMI) diverts the aim of medical and health groups and medical staff from maximizing medical income to reducing costs under the premise of ensuring medical effect and therefore obtaining the best economic benefits. In this way, medical and health groups will try to reduce various costs, making drug expenditures the first to be cut. Methods including “centralized bidding, purchase with quantity, quantity-based pricing, and secondary bargaining” are used to lower drug prices and costs. At the same time, medicines are used in strict accordance with the treatment needs. Fewer cases of over-treatment and over-medication lead to less use of drugs. Such measures shrink the profit margins of drug suppliers and cut their profits. In terms of pharmaceutical payment, the medical insurance funds are paid in package to medical and health groups at first, so the groups with financial support no longer need to delay pharmaceutical payment. Timely pharmaceutical payment eases the pressure of capital turnover for drug suppliers.

5.4.5.2 Influence on consumables suppliers

Generally, the income of medical institutions comes from drugs, check-ups, inspections, treatments and ancillary expenses. Under the Medical Treatment Combination Model

(MGH+IBPMI), as the price and usage of drugs are reduced, excessive and unnecessary check-ups, inspections and treatments are banned, which results in the decreased amount of inspection reagents and inspection consumables. At the same time, measures including “centralized bidding, purchase with quantity, quantity-based pricing, and secondary bargaining” that are used in drug purchasing, are also taken in the procurement of consumables to cut price. Furthermore, in the reform of salary scheme, the saved medical insurance funds are allocated to increase the income of medical staff. And hospitals’ supervision departments take more stringent management and punishment measures to reduce and eliminate commercial bribery. For consumables suppliers, as profit margins are reduced, the risk of commercial bribery can be avoided, so the supply of consumables tends to be normal and stable.

5.4.5.3 Influence on suppliers of medical equipment

As an indispensable part of the daily operation of medical institutions and the treatment of patients, medical equipment plays a supporting role in medical institutions. The Medical Treatment Combination Model (MGH+IBPMI) has a considerable impact on the suppliers of medical equipment: Firstly, affected by “centralized bidding, purchase with quantity, quantity-based pricing, and secondary bargaining”, the supply price is reduced with fewer profit margins. Secondly, in order to retain patients with better medical services and treatment skills, medical and health groups will timely upgrade their medical equipment, which is a business opportunity for suppliers to raise profits. Thirdly, there are new and stricter requirements for after-sales services, especially for equipment maintenance, rapid troubleshooting, safety and reliability, after the implementation of the Medical Treatment Combination Model (MGH+IBPMI).

5.4.6 Impact on government officials

As government officials are important stakeholders in carrying out the Medical Treatment Combination Model (MGH+IBPMI), the impact of the new operation model on them cannot be ignored. This study interviewed key government officials, and officials from medical insurance department, health administrative department and financial department, attempting to evaluate the Medical Treatment Combination Model (MGH+IBPMI).

5.4.6.1 Impact on key government officials

Key government officials play an important role in implementing the Medical Treatment

Combination Model (MGH+IBPMI). In China's system, medical and health care is the main component of social security and stability, the foundation for economic and social development, and also a social governance topic that Chinese officials at all levels have been exploring for years. The new operation model reduces the residents' burden for medical treatment and guarantees the security of medical insurance. Medical institutions are on the healthy development track, which is consistent with the government's original intention to establish medical institutions. Also, the contradiction between doctors and patients is alleviated. The Medical Treatment Combination Model (MGH+IBPMI) also alleviates the government's worries and concerns about medical and health services, so that government officials have more energy to carry out economic construction and other work. The interviewed key government officials warmly welcomed and were very confident about the Medical Treatment Combination Model (MGH+IBPMI).

5.4.6.2 Impact on the officials of the healthcare security administration

Established in 2018, the healthcare security administration is responsible for the management and payment of medical insurance according to the division of government responsibilities. In the use of funds, the administration acts as both an athlete and a referee.

Medical Treatment Combination Model (MHG+IBPMI) "takes" the medical insurance from the medical insurance department to the medical and health group. In fact, it assigns the right to use the fund of the healthcare security administration to the medical and health group, and consequently the official power is limited and reduced. However, at the same time, the Medical Treatment Combination Model (MHG+IBPMI) secures the medical insurance. The healthcare security administration officials were opposed to the new operation model at the beginning. Even as the results of the one-year operation showed the safety of medical insurance, they were still seeking the shortcomings of the new model and firmly opposed to it. On the other hand, the new model forced the officials of medical insurance department to explore ways to monitor the use of health care funds and the supervision and management of medical institutions.

5.4.6.3 Impact on the officials of health administrative department

The health administrative department is the initiator of the Medical Treatment Combination Model (MGH+IBPMI). The successful operation is a great encouragement to the officials of the department. Particularly, after the DC model was introduced at the Health and Wellness Conference of HN Province in 2020, it boosted the confidence of officials of the health

administrative department in DC County participating in the design of the new model. The change of the payment model of medical insurance gives the medical institutions financial initiative, and makes it more persuasive for the officials to manage the medical institutions and more convenient for them to carry out the work. Moreover, the prominent public welfare of medical institutions increases the sense of achievement of the health administration officials and improves their social status and public evaluation. This gives them a greater say in the government accordingly.

5.4.6.4 Impact on officials of the financial department

Medical insurance is important for the financial expenditure of the financial department. The security of medical insurance has a great impact on the financial department and its officials. In 2017, before the implementation of the Medical Treatment Combination Model (MGH+IBPMI), the medical insurance of DC County overspent by 27.11 million yuan. If the insured residents had failed to cash in the medical insurance reimbursement in time, it would have caused serious consequences, and the financial department must pay for the overspent medical insurance, so the officials' worry was self-evident. In 2019, a year after the implementation, the department returned to profit by achieving a balance of 120.94 million yuan. The operation turned the overspending into surplus, which relieved the officials' concern and solved their difficulties. This enabled the department to have more funds for other payments.

5.5 Impact of the Medical Treatment Combination Model (MGH+IBPMI) on patients' flow

This study analyzed the impact of the Medical Treatment Combination Model on patient flow from perspectives of resource allocation, service accessibility, the utilization efficiency of medical resources, medical payment, and the construction of the hierarchical diagnosis and treatment system. Also, it summarized the impact and contribution of the model on patient flow.

5.5.1 Analysis from the perspective of resource allocation

Through investigations, interviews and field observations, with the "integrated" operation and management of medical alliance, the competition among county- and township-level medical institutions has been transformed into the division and cooperation in "one family". The

problem of insufficient material channeling posed by the government has been greatly improved. In order to save medical insurance to the maximum extent, the medical group guides patients to primary medical institutions. By improving the medical and technical conditions of the institutions, the group optimizes and strengthens the environmental facilities of the institutions. By establishing county-level technical centers, the county and townships can share medical technology and equipment. Experts from county-level medical institutions are sent to primary medical institutions for medical treatment by means of dispatching or rotation to give full play to the talent, specialties, technique and other advantages of leading hospitals. The group sends professional physicians with middle or senior professional title and technical personnel to member units to carry out ward rounds, discuss difficult cases and start professional training, so as to channel human resources down to the community level. According to the statistics of the health administrative department in DC County, each medical and health group arranges a certain proportion of medical personnel with the qualification of attending doctor or above in the original county hospital to primary medical institutions every day for consultation, ward rounds and teaching. This will be normalized and institutionalized in the long run. Medical personnel are arranged to serve in primary medical institutions every day. As a result, the integrated operation and management model has greatly improved and enriched the material and human resources at the community level, and has moved towards the equality of services at county- and township-level medical institutions. This also attracts patients in the jurisdiction to seek medical care in primary medical institutions.

5.5.2 Analysis from the perspective of service accessibility

Through the questionnaire survey, interview and on-site observation, it is clear that the main basis for patients to choose medical institutions is medical services. The original trend of patients seeking medical treatment is to enjoy better medical services. Under the “integrated” operation model of medical alliance, in order to make reasonable use of medical insurance and make effective use of existing health resources at the grassroots level, the medical group guides patients to primary medical institutions. The high-quality medical resources originally allocated to the county achieve are effectively channeled to the grassroots level. Six centers have been set up in the county, including the Central Sterile Supply Department, Electrocardiogram (ECG) Diagnosis Center, Center for Clinical Laboratories, Medical Imaging Center, Pathological Examination Center and Remote Consultation Center. The

medical and health group connects with the county- and township-level medical and health institutions, and the results of medical laboratory science and medical examination are mutually recognized. This avoids repeated examination, saves medical costs and facilitates people to seek medical treatment. Also, the qualified non-profit medical and health institutions in the county are encouraged to participate in the construction of medical community. According to statistics: in 2019 when DC County implemented the “integrated” operation model, the county funded 990 million yuan to renovate and upgrade the county-level hospitals, which has constantly improved the service capacity of the medical institutions led by the medical alliance. An investment of 86 million yuan was made to renovate and upgrade 12 township hospitals, 19 township-level comprehensive traditional Chinese medicine (TCM) service stations, 488 village-level clinics and 298 village TCM treatment rooms. As a result, the grassroots network was gradually strengthened. Thirty-five million yuan was invested to build a national health information service platform to promote the development of “Internet + medical and health care”. In this way, people can enjoy expert diagnosis and treatment services without leaving their hometown. This enhances the accessibility of services of primary medical institutions and gradually realizes the flow of patients to the grassroots level. This proves that the accessibility of medical services is also an important factor to the patient flow.

5.5.3 Analysis from the perspective of utilization efficiency of medical resources

Through investigations, interviews, on-site observations, and data analysis, it is shown that after the implementation of the Medical Treatment Combination Model in DC County and the implementation of the “integrated” operation and management of the medical and health service community, the number of hospital visits and hospitalizations in primary medical institutions has undergone major changes. In 2019, the growth rate of outside-county hospital visits compared with the previous year dropped from 22.60% in 2018 to 12.94%. And in 2020, it dropped to -7.67%, achieving a continuous decline in the external turnover rate. Based on the analysis of the number of inpatients in township healthcare centers, the rate of hospital visits within the county in 2019 increased by 41.85% compared with that of 2018. Analysis of the above statistics show that with the “integrated” operation and management of medical alliance, the utilization efficiency of the health care resources in the county, especially the medical resources at the grassroots level has been greatly improved. In the past, county-level hospitals were overcrowded while primary medical institutions were left empty, now the

situation has been fundamentally reversed. The bed turnover rate at county-level hospitals, the bed usage rate in primary medical institutions, the two-way referral rate of patients, the county consultation rate, and the reimbursement rate of patients seeking medical treatment have all been greatly raised. The utilization efficiency of medical resources in the county has been largely promoted.

5.5.4 Analysis from the perspective of the medical payment

DC County has implemented the “integrated” operation and management of medical alliance and the policy of integrated bundled payment of medical insurance. Afterwards, the county health administration formulated the payment by disease type method covering 190 clinical pathways and price limits for 35 single diseases at the second-level hospitals. It also set a payment method covering 88 clinical pathways at the township hospital. According to the official statistics of the health administration in DC County: In terms of the per capita cost of inpatients in township healthcare centers, in 2019, it was 1801 yuan, a decrease of 89 yuan from 2018’s 1890 yuan, with a growth rate of -4.71%. In 2020 it was 1669 yuan, 132 yuan less than that of 2019, with a growth rate of -7.33%. The usage rate of TCM diagnosis and treatment programs at the grassroots level has increased from 13.6% in 2018 to 20.1%, which has effectively curbed the excessive growth of medical expenses. The implementation of hierarchical diagnosis and treatment and standardized and reasonable treatment has cut patients’ unnecessary medical expenses, reduced their burden for medical treatment, and avoided the risk of overspending medical insurance.

At the same time, the medical and health group have fundamentally reduced the risk of medical payment. They took measures such as popularizing medical and healthcare knowledge, improving residents’ health literacy, carrying out disease screening and health intervention. They strived to reduce the frequency and severity of diseases as well as protect residents from diseases.

5.5.5 Analysis from the perspective of the construction of hierarchical diagnosis and treatment system

DC County has implemented the “integrated” operation and management of medical alliance and the policy of integrated bundled payment of medical insurance. Arranged by the health administration, the medical and health group takes a series of supporting measures. As a result, the allocation of medical resources is optimized, and the functional orientation of the leading

hospitals and member units is further clarified. Medical and health groups formulate the disease diagnosis and treatment catalogue at county and township levels, clearly stipulating the diseases that are treated in primary medical institutions. Guided by it, patients can seek medical treatment for their major diseases within the county; for common diseases, within the township; and for minor diseases, within the village. The model has standardized the referral procedure and realized the hierarchical diagnosis and treatment, and an orderly medical treatment pattern is hence established.

5.6 Discussion

This study compared and analyzed the relevant data before and after the implementation of the Medical Treatment Combination Model (MHG+IBPMI), as well as interviewed relevant stakeholders. Then, the effects of the Medical Treatment Combination Model (MHG+IBPMI) in DC County could be concluded as follows.

5.6.1 Shifting hospitals' profit-seeking direction

Hospitals aim to create a steady stream of income and attract more patients to obtain economic benefits (He, 2014). Since the end of the 1980s, hospitals and medical workers have been inclined to generate income by inducing demands and providing excessive or unwanted medical treatment. Such practice deviates from the life-saving and health-caring goals of medical institutions, while “public welfare” and “return to public welfare” are important value orientations for deepening the reform of the medical and health system (Cao & Chen, 2011). The research result shows that, according to the medical reform plan of DC county, by reforming the payment method of medical insurance, DC County has implemented the policy of covering the global per capita budget, excluding the overspending and reserving the surplus. The risk control fund is withdrawn from the medical insurance fund according to the total amount raised of that year. Of the 90% of the total quarterly budget of the remaining fund, 80% is allocated to the account of the medical group. The remaining 20% is reserved as the assessment fund and will be paid after the year-end assessment according to the provisions. The medical group is responsible for the reimbursement of medical expenses of residents in the jurisdiction area. The reimbursement of out-of-county inpatients (including major disease insurance) is also budgeted. Assessed by the county health administration, the surplus is independently distributed to medical institutions at the county, township and village levels according to the ratio of 5: 3: 2. In principle, the assessed overspending surplus should be

undertaken by the leading hospital of the county-level medical group.

This policy has fundamentally changed the profit-seeking direction of medical institutions. In the past, medical institutions profited from diagnosis and treatment such as examination, medication and surgery. Now the medical insurance has been allocated to medical institutions in advance. Only after medical institutions have completed the disease diagnosis and treatment in the jurisdiction can they count the surplus as their income. Besides, the medical institutions should be responsible for the risks of the medical insurance. Consequently, they have to offer science-based and reasonable diagnosis and treatment to reduce the cost thereto to the greatest extent. For instance, in the past, medical institutions made profits by maximizing the expenses of diagnosis and treatment, which is outward profit-seeking. At present, however, they earn by minimizing the expenses and balancing medical copying, which is inward profit-seeking. In this way, the medical institutions have shifted their profit-making direction.

5.6.2 Improving the usage efficiency of medical resources in township healthcare centers

Some Chinese scholars analyzed the medical resources utilization efficiency data of township healthcare centers in HN Province and hold that excess investment and insufficient production capacity coexist and that the usage efficiency of health resources in HN Province's township healthcare centers is low. The output capacity of township hospitals is insufficient and the production efficiency is low (Wu, 2014). Some studies analyzed the changes in the medical service efficiency of township healthcare centers in Zhejiang Province from 2005 to 2015 before and after the new medical reform. It is believed that before the new medical reform, the waste and underutilization of health resources were serious, and the low operating efficiency of township healthcare centers was the main problem. The number of medical treatments and hospitalizations through the medical reform has increased significantly, which is reflected in the improvement of diagnosis and treatment efficiency (Li & Gao, 2017). Studies in China's southern and northern provinces have proved that improving the usage efficiency of medical resources in township healthcare centers is a top priority. Due to the implementation of the Medical Treatment Combination Model (MHG+IBPMI) in DC County, the medical institutions have adopted the "integrated" operation and management of medical alliance and implemented the policy of covering the global per capita budget, excluding the overspending and reserving the surplus. Therefore, they actively take measures such as sharing medical resources, enhancing service accessibility, improving service quality and

regulating medical behaviors. All these measures aim to offer science-based and reasonable treatment, reduce the medical burden for patients, improve the utilization performance of insurance, and attract patients to township hospitals for the sake of improved utilization efficiency and cost-efficiency of medical resources at the grassroots level. According to the statistics of the health administration of DC County: in 2017, there were 27,387 person-times of hospital stay in township healthcare centers; in 2018, 27,355, a YOY (year-on-year) increase by -0.12%; in 2019, 38,769, a YOY increase by 42%, and in 2020, 39,979, a YOY growth of 3%. This indicates that the usage efficiency of medical resources in township healthcare centers has been greatly raised, subverting the prospect of unused resources at township healthcare centers.

5.6.3 Reducing the payment risk of medical insurance and the medical burden for patients

Some researchers believe that due to the objective existence of information asymmetry between the medical service demander and the supplier, and that the supplier tends to take a dominant position in the medical service, measures that are taken to restrict demand are often difficult to achieve the desired effect (Peng, 2007). China's famous "Sanming Medical Reform" adopted centralized bidding to reduce drug prices. It reformed the salary system for medical staff to curb doctors' urge to sell drugs with annual salary. By implementing reforms of medical insurance payment methods, such as the idea of "total settlement and sole responsibility for one's own profit or losses" with single disease payment, it controlled the growth of medical expenses, and reduced the pressure of medical insurance payment and the burden of medical care for patients (Zhan, 2014). And this research suggests that by reforming the payment method of medical insurance, DC County has implemented the policy of covering the global per capita budget, excluding the overspending and reserving the surplus. Medical institutions have changed the profit-seeking direction, which has stimulated the medical institutions and staff to cut costs. The self-payment rate of inpatients and the average cost of inpatients in county- and township-level medical institutions have been reduced to a certain extent. The average length of hospital stay has decreased compared with that at the same period. Unnecessary medical expenditure has been avoided, and the risk of medical insurance payment and the medical burden for patients has been decreased.

5.6.4 Unifying the pursuit for medical insurance, patients, hospitals and doctors

As a provider of medical services, public hospitals should pay attention to the social and economic burden, fairness and resource utilization efficiency of medical consumers, and take into account the needs and interests of all parties (Bi, 2008). Some Chinese scholars believe that to control the unreasonable increase of medical expense, it is necessary to carry out public financial policy reform, third-party fee control, information disclosure and other means to standardize and restrict behavior of hospitals and doctors, the goal of controlling medical expenses can be achieved (Yue & Wang, 2016). The Medical Treatment Combination Model (MHG+IBPMI) proposed in this study unifies the pursuit of medical insurance, patients, hospitals and doctors. For instance, the goal of the medical insurance department is to meet the medical needs of patients as far as possible on the premise of ensuring no risk in the medical insurance. In the case that the government does not invest enough in public medical institutions, hospitals still have to pursue certain profits in actual operation to meet the needs of staff wages, performance, equipment renovation and hospital development. Medical insurance implements the policy of covering the global per capita budget, excluding the overspending and reserving the surplus. This promotes the medical institutions to transform from making profits through medical service charges to saving medical expenses through science-based and reasonable treatment. In a nutshell, it means “curing the disease while spending less”. Therefore, through performance appraisal and other methods, medical institutions require doctors to save medical insurance as much as possible under the premise of curing the disease. The higher the health level of residents in the jurisdiction area is, the lower the prevalence rate will be, the lower the risk of medical insurance payment will be, the lower the payment burden will be, and the better the financial status of the hospital will be. In this way, the pursuit for medical insurance, patients, hospitals and doctors is unified, that is, residents’ health. This is also consistent with the central government’s major policy of building a “Healthy China”.

5.6.5 Promoting the hierarchical diagnosis and treatment pattern

In 2015 and 2017, the General Office of the State Council of China issued twice the *Guiding Opinions on Promoting the Construction of a Hierarchical Diagnosis and Treatment System* (General Office of the State Council of the PRC, 2015; General Office of the State Council of the PRC, 2017), emphasizing the construction of a hierarchical diagnosis and treatment system and requiring relevant departments to jointly advance it so as to deliver good results.

On March 8, 2019, main officials of the National Health Commission, said in a national concentrated interview with the media, “The hierarchical diagnosis and treatment system is a major system implemented since the new medical reform. In a sense, the date when the hierarchical diagnosis and treatment system is realized is the time when China’s medical system reform succeeds.” (Please see the official Chinese medical system’s site https://www.sohu.com/a/299991636_464387). Some Chinese scholars believe that in China, primary medical resources are idle and high-quality medical resources are in shortage. Better allocation of medical resources should be promoted among different institutions, different regions, and urban and rural areas, and clarifying the positioning of the government and the market is necessary for the promotion of policies such as hierarchical diagnosis and treatment (Xia, 2019). Some Chinese scholars have conducted research and analysis from the stakeholders’ perspective in the medical service system under the hierarchical diagnosis and treatment model, and put forward relevant measures and suggestions for in-depth promotion and improvement of hierarchical diagnosis and treatment. They believe that how to guide patients to choose medical institutions in a scientific and reasonable manner by making good use of various policies and ensure that patients can orderly flow in the medical service system represents an important breakthrough for the complete realization of hierarchical diagnosis and treatment (Chen, 2019). The Medical Treatment Combination Model (MHG+IBPMI), with the alliance of county-level and township-level medical institutions, has integrated the interests of county medical institutions with those of the township healthcare centers. To make efficient use of existing medical resources and minimize medical costs, the medical group has adopted a series of measures to divert patients. By optimizing the allocation of medical resources, patients can seek hierarchical medical treatment, in other words, “seeking medical treatment for minor diseases in village clinics; common diseases, township hospitals; and major diseases, county-level hospitals”. Meanwhile, by standardizing and optimizing the referral procedures, the preliminary pattern of hierarchical diagnosis and treatment is built.

5.6.6 Presenting new challenges to the comprehensive supervision

Under the Medical Treatment Combination Model (MHG+IBPMI), the “integrated” operation and management of medical alliance and the policy of integrated bundled payment of medical insurance has been implemented. How to supervise medical institutions has become an urgent issue to solve. After investigations and interviews, the following aspects have been sorted out: (1) How can the mechanism and the system control and restrict medical institutions and staff

to ensure that they offer science-based and reasonable treatment for patients instead of prevarication? (2) How can the mechanism and the system control and restrict medical institutions to prevent them from saving money instead of doing their best to treat patients? (3) How can medical institutions and staff consciously practice according to law under the new operation model and put the patient-centered philosophy in practice? (4) How can the mechanism and the system prevent the superior medical institutions from siphoning the patients and medical staff of primary hospitals?

5.6.7 Impact on public health service system

China's public health service system consists of disease prevention and control, health education, maternal and child healthcare, mental health, emergency treatment, blood collection and supply, health supervision and family planning. After DC County implemented the "integrated" operation and management of medical alliance and the policy of integrated bundled payment of medical insurance, various medical and health groups take a series of measures to save medical expenses. In this context, how can we control the medical institutions, especially the leading hospitals, so that they can balance but not neglect disease prevention and control, health education, maternal and child health care, mental health, emergency treatment, blood collection and blood supply, health supervision and family planning? This is one of the topics to be studied in the future.

5.6.8 The new operation and management mechanism is to be improved

Under the Medical Treatment Combination Model (MHG+IBPMI), the "integrated" operation and management of medical alliance and the policy of integrated bundled payment of medical insurance is a brand-new attempt for DC County, the HN province and even China. Under this circumstance, the mechanism is inevitably to be improved. For example, the integrated operation and management of county and township medical institutions is just an attempt, and there are many concerns about county-level medical institutions. The construction of the evaluation system of "integrated" operation and management of medical alliance is not mature. The performance evaluation and management of integrated bundled payment of medical insurance need to be explored.

First, the difficulties in allocating the new medical resources. The policy of "integrated" operation and management of medical alliance in DC County has guided the allocation of medical resources to a certain extent. Nevertheless, the county and township medical

institutions have not been integrated. Primary medical institutions are still independent legal entities. The old system of subordinate relationship has not been abolished. The county-level medical institutions still have some concerns about the sustainable material channeling down to the community level.

Second, the “leverage” role of medical insurance policy on hierarchical diagnosis and treatment falls short. In the actual operation, the authority of medical insurance belongs to the medical insurance department. DC County is a demonstration area to implement the “integrated” operation and management of medical alliance and the policy of integrated bundled payment of medical insurance. The county fails to keep up with the supporting policy of medical insurance payment for hierarchical diagnosis and treatment, so the “leverage” role of medical insurance policy has not been fully exerted.

Third, the incentive mechanism of medical staff is to be studied and explored. Medical staff is the key force in the reform of the medical and health care system. Under the policy of bundled payment per capita of medical insurance, there is a lack of effective mechanism to motivate medical staff. Their enthusiasm has not been fully aroused. This still needs to be explored and studied.

5.7 Summary

5.7.1 Main content of the Medical Treatment Combination Model (MHG+IBPMI)

(1) Establishing medical alliance: Realizing the county-village integrated health management, improving the internal governance structure, giving the management autonomy to medical and health group, and deepening the reform of salary system.

(2) Reforming the payment model of medical insurance: The policy of covering the global per capita budget, excluding the overspending and reserving the surplus. Overall 10% of the total raised fund of that year is drawn as risk fund. The remaining 90% is the total budget which is converted into the insurance expense per capita (corresponding to each insured resident in the jurisdiction area). The budget is allocated to the medical and health group who is responsible for the reimbursement of medical expenses of residents in the jurisdiction area.

(3) Reforming the operation and management model: Unifying personnel, financial and material management.

(4) Taking supporting measures: Strengthening information construction, strengthening assessment and supervision, providing contract services, sharing resources, standardizing

medical behaviors, and promoting hierarchical diagnosis and treatment.

5.7.2 Major changes after the implementation of the Medical Treatment Combination Model (MHG+IBPMI) in DC County

(1) The hospital medical expenditure drops. By minimizing medical expenses and balancing medical costs, medical institutions change the profit-seeking direction.

(2) The medical resources are shared. Medical institutions actively take measures such as sharing medical resources, enhancing service accessibility, improving service quality and standardizing medical behaviors. They aim to offer science-based and reasonable treatment, reduce the medical burden for patients, improve the utilization performance of medical insurance and attract patients to township hospitals. All can improve the utilization efficiency and effectiveness of medical resources at the grassroots level.

(3) The medical expenses of patients reduce. The healthcare reform has motivated the medical institutions and staff to cut costs. The self-payment rate of inpatients and the average cost of inpatients in county and township medical institutions have been reduced to a certain extent. The average length of hospital stay has decreased. Unnecessary medical expenditure has been avoided. The risk of medical insurance payment and the medical burden for patients have been reduced.

(4) Unifying the pursuit for all parties. Through performance assessment and other methods, medical institutions require doctors to save medical insurance as much as possible under the premise of curing diseases. The higher the health level of residents in the jurisdiction area is, the lower the prevalence rate will be, the lower the risk of medical insurance payment will be, the lower the payment burden will be, and the better the financial status of the hospital will be. In this way, the pursuit for medical insurance, patients, hospitals and doctors is unified.

(5) Forming a hierarchical medical pattern. To make efficient use of existing medical resources and minimize medical costs, the medical group has adopted a series of measures to divert patients. By optimizing the allocation of medical resources, patients can seek hierarchical medical treatment, in other words, “seeking medical treatment in village clinics; common diseases, township hospitals; and major diseases, county-level hospitals”. Meanwhile, by standardizing and optimizing the referral procedures, the preliminary pattern of hierarchical diagnosis and treatment is built.

5.7.3 Major problems after implementing the Medical Treatment Combination Model (MHG+IBPMI) in DC County

(1) The management system is to be smoothed. Nevertheless, the county and township medical institutions have not been integrated. Primary medical institutions are still independent legal entities. The old system of subordinate relationship has not been abolished. The county-level medical institutions still have some concerns about the sustainable material channeling down to the community level.

(2) The medical insurance policies are to be improved. The county fails to keep up with the supporting policy of medical insurance payment for hierarchical diagnosis and treatment, so the “leverage” role of medical insurance policy has not been fully exerted.

(3) The incentive mechanism is to be strengthened. Under the policy of bundled payment per capita of medical insurance, there is a lack of effective mechanism to motivate medical staff. Their enthusiasm has not been fully aroused. This still needs to be explored and studied.

5.7.4 Suggestions for future improvement

(1) It is suggested to control and restrict medical institutions and staff to ensure their science-based and reasonable treatment for patients instead of prevarication.

(2) It is suggested to control and restrict medical institutions to prevent them from saving money instead of doing their best to treat patients.

(3) It is suggested to encourage medical institutions and medical staff to consciously practice according to law under the new operation model and put the patient-centered philosophy in practice.

(4) It is suggested to manage and control the mechanism and system to keep superior medical institutions from siphoning the patients and medical staff of primary hospitals (He, 2014).

Chapter 6: Conclusion

6.1 Introduction

In this chapter it is presented the general conclusions, then the conclusions are presented by topic. Finally, the future research and limitation are discussed. The health resources in DC County, HN Province, China, are characterized by a sound basic medical and health system but with no significant medical association and unplanned patient flow. In some health centers there is lack of patients and idle resources. Some overcrowded county hospitals challenges medical safety. There is a risk of overspending medical insurance payment and increasing individual payment burden at the same time. Due to these problems, DC County put forward a medical reform plan and implemented a new operation model of medical treatment association, namely, integrating county and township medical institutions into medical and health group plus integrated bundled payment of medical insurance (MHG+IBPMI), and formed the medical alliance.

Implement a new medical reform operation and management model, the medical community operation model (MHG+IBPMI), that is, the integration of county and township medical institutions (MHG) + integrated medical insurance package payment IBPMI. This new operation model is led by four county-level hospitals in the county. The township healthcare centers have been incorporated into the integrated management and afterward, a brand-new compact medical alliance has been formed. At the same time, the method of payment has been reformed under the policy of covering the global per capita budget, excluding the overspending and reserving the surplus. Overall 10% of the total raised fund of that year is drawn as a risk fund. The remaining 90% is the total budget which is converted into the insurance expense per capita. The budget is allocated to the medical and health group who is responsible for the reimbursement of medical expenses of residents in the jurisdiction area. There is the reform of the operation and management model and shifted hospitals' profit-seeking direction. This aims to reduce the medical expenses of hospitals and patients as well as the risk of medical insurance payment being unable to make ends meet. To improve the efficiency of medical resources in township healthcare centers, the medical resources are going to be shared and a hierarchical medical pattern is implemented. The measures will also

improve the accessibility of county medical services and promoted their benign development.

This chapter also analyzes and discusses the limitations, policy implications of this study and suggestions on future research. The limitations of this study are mainly related to the following four aspects, namely the sample size and representativeness, scope of data collection, impact of the new operation model on the current healthcare system and resistance from various aspects. In terms of policy implications, it concludes that the new operation model should unify the pursuit for the government, hospitals and patients, standardize the responsibilities of government and market, reconstruct the new operation mechanism, and help to solve the current problems. Finally, it makes assumptions on the future research.

6.2 Conclusion

6.2.1 Characteristics of regional health resources

The medical security system covers a wide range of areas but with relatively low level of security, and the burden of patients' medical expenses is heavy. The resources distribution is still uneven, namely, the high-quality medical resources are mainly concentrated in cities, while the township healthcare centers have low utilization rate of resources and idle resources; at the same time, county hospitals are overcrowded and medical safety is challenged.

6.2.2 Key points of the reform plan (setting up and implementing the new Medical Treatment Combination Model (MHG+IBPMI) in one of China's counties

Establishing medical alliance, integrating the integrated management of county and rural health, and realizing the management autonomy of medical and health group; reforming the payment method of medical insurance with the policy of covering the global per capita budget, excluding the overspending and reserving the surplus; reforming the operation and management model and unifying the management of personnel, finance and materials.

6.2.3 Possible stakeholders involved in the regional medical and health reform method after setting up and implementing the Medical Treatment Combination Model (MHG+IBPMI) in one of China's counties

Possible stakeholders involved in the regional medical and health reform method include institutions (units) and personnel. The institutions involve county hospitals, township healthcare centers, private hospitals, medical insurance department, health administrative

department, financial department and other functional departments. Personnel include hospital leaders and managers (administrative staff), doctors, nurses (nursing staff), medical technicians and logisticians; patients; suppliers; government officials.

6.2.4 Impact of the reform on stakeholders after setting up and implementing the Medical Treatment Combination Model (MHG+IBPMI) in one of China's counties

The profit-seeking direction of hospitals, improved the utilization efficiency of medical resources in township healthcare centers, reduced the payment risk of medical insurance and the burden of patients for medical treatment, unified the pursuit for medical insurance, patients, hospitals and doctors, and realized the orderly patient flow.

6.3 Research limitations

This research uses both theoretical method and empirical method to conduct in-depth analysis of the impact of implementing the Medical Treatment Combination Model (MHG+IBPMI) on patients' flow. Describes the pattern and theoretical model of the operation of medical treatment association in the county and obtains some conclusions with theoretical and practical application value. Due to the influence and restriction of subjective and objective factors, there are still some limitations and deficiencies in this research, which are mainly reflected in the following aspects.

6.3.1 Low sample size and limited representativeness

Due to the constraint of objective research conditions, field investigation failed to cover all medical institutions within the county. Instead, the research adopted the typical research method. Although the sample has wide coverage, it does not reach full coverage, and its representativeness is still insufficient, which may have certain influence on the accuracy of the research conclusion. DC County, the research object, has certain particularities in terms of the basis of medical and health care. The People's Hospital, TCM Hospital, and Maternity & Child Healthcare Hospital in the county have relatively strong comprehensive strength in human resources, technology and equipment, and balanced development, and county medical institutions have the ability to act as the leading unit of the medical and health group. However, other counties except DC are not necessarily similar in this point, which challenges the replication and promotion of the new model.

6.3.2 Relatively limited range of data acquisition

Data collection was limited to DC County, and the results of the research could explain well the average patient flow in the operation model of DC County medical treatment association participating in the survey. However, there may be some individual differences if this conclusion is extended to other medical institutions outside DC County. DC County is a plain county located in the middle-east China, which has a developing economy, a large population and relatively insufficient health resources. The data acquisition here is limited.

6.3.3 Greatly affected by subjective judgment

In this thesis, part of the data come from the subjective judgment made by the respondents, thus largely influenced by their actual work experience, medical experience and understanding of the investigated content. Therefore, the result can hardly reflect the actual situation totally objectively, which has a negative impact on the objectivity and scientificity of the data.

6.3.4 Great impact of the research object on the current system and great resistance from various aspects

The operation model of the research object greatly adjusted the responsibilities and interests of relevant institutions, and the power of medical insurance and health departments. Particularly, the power adjustment of the medical insurance and health administrative departments has great impact on the current system, which will cause resistance from various parties to a certain extent and also pose considerable challenges to the promotion and replication of the research model.

6.4 Policy implications

Based on the research and analysis of the new operation and management model, namely the Medical Treatment Combination Model (MHG+IBPMI) in DC County, this study makes some conclusions for reference in medical and health care policies, including the following points:

6.4.1 Unifying the pursuit for government, medical insurance, hospitals and patients through the new policy

In order to analyze the integration of the medical institutions, this research adjusts and mobilizes the power of the institutions to allocate resources, so that the interests of government, medical institutions and patients tend to be consistent and their pursuit is unified to the goal of health. In the policy design, medical institutions receive the payment of medical insurance, so patients' treatment expenses become the cost of the institutions, which changes the way profits of the institutions are maximized. As a result, the policy drives the institutions to actively pursue patients' health and adopt measures to minimize costs. The institutions start promoting medical resources to be effectively channeled to the grassroots level, making health intervention as soon as possible, implementing public health services, and promoting health education, hierarchical diagnosis and treatment, and reasonable and science-based treatment.

6.4.2 The government and the market taking their respective responsibilities

The Medical Treatment Combination Model (MHG+IBPMI) of DC County requires the government and the market to take their respective responsibilities. The government's responsibility is to make rules, use the rules to guide the market to allocate resources, and supervise the market's compliance with the rules. And the market's responsibility is to allocate resources and operate under the rules made by the government and accept its supervision at the same time. This is embodied in the management and use of medical insurance. The responsibility of the government (medical insurance institution) should supervise whether medical institutions treat patients in accordance with relevant norms and make scientific and reasonable use of medical insurance. It should hand over the funds to the market (medical institution) instead of directly getting involved in the operation (accepting applications and allocation). On the other hand, the operation of medical institutions should be done by the institutions themselves, and the government (health administrative department) should supervise and assess, rather than directly intervene or even participate in their operation. The model adopted by this research was to pay the overall medical insurance to medical institutions, integrate township healthcare centers and other grassroots medical institutions directly managed by the health administrative department in the past into the medical and health group, and realize integrated management.

6.4.3 Reconstructing the new operation mechanism through the new policy

DC County adopted the policy of overall allocation of medical insurance to purchase the overall health services of residents in the jurisdiction area, which changed the past traditional practice of purchasing medical services. In the past, when patients only purchased medical services, medical institutions always hoped for more patients, because they could only charge from their treatment. If there are fewer patients, the institutions would have lower costs, so they would not take attention residents' health. With the policy of overall allocation of medical insurance to purchase the overall health services of residents in the jurisdiction area, the medical insurance implements the principle of "reserving the surplus and excluding the overspending". The fewer patients and the less expenditure are, the more surplus will be. So medical institutions are stimulated to reduce the number of patients. Consequently, the institutions take measures, including providing good basic public health services, disease screening, health intervention, hierarchical diagnosis and treatment, and science-based and reasonable treatment to try to reduce the frequency and severity of diseases to save more medical insurance. This will be an ideal new medical and health service mechanism.

6.4.4 Research's contribution to solving the current problems

6.4.4.1 Reference for medical expense control

To ensure the safety of medical insurance and to control medical expenses have been the important tasks of medical insurance departments in recent years. For example, for the research object, DC County, driven by the desire for profit, the payment pressure of medical insurance of medical institutions increases year by year, so does the risk. In the past model, when medical institutions admitted patients, medical insurance needed to pay for them, so medical institutions would not actively control medical expenses, since they also were not motivated to control the expenses. Under medical expense control, the model in this study has changed the profit-seeking direction of medical institutions and provided a new scheme to prevent overspending of the medical insurance. After receiving the payment of medical insurance, medical institutions assume the responsibility of preventing the medical insurance from running out of money. In the treatment process, on the premise of curing patients, medical institutions strive to save medical insurance.

6.4.4.2 Reference for the construction of hierarchical diagnosis and treatment system

Hierarchical diagnosis and treatment have always been considered as the main way to achieve

the goal of medical reform, as well as the content to be explored at all levels. The disordered patient flow has always affected medical reform. The model in this study provides a useful reference for the construction of hierarchical diagnosis and treatment. The premise of introducing the hierarchical diagnosis and treatment is to channel medical resources down to the grassroots level. In the past, county and grassroots medical institutions were separated from each other in the system, so the county medical resources could not be channeled to the grassroots level. The model proposed in this research breaks the isolation within the system in the past. In order to reduce residents' incidence of disease and medical expenses, the newly established medical and health group should channel medical resources down to the grassroots level, implement public health services and health intervention at the grassroots level, guide patients with common diseases to the grassroots level for treatment, and refer patients with serious diseases to superior hospitals. In this way, the hierarchical diagnosis and treatment pattern would be naturally formed. In reality, medical institutions in DC County have invested considerable funds to improve the infrastructure of township healthcare centers and other grassroots medical institutions to guide patients to the grassroots level for treatment. This model can provide reference for government decision-making.

6.4.4.3 Reference for standardizing medical institutions' medical behavior

Before the implementation of Medical Treatment Combination Model (MHG+IBPMI), as medical institutions' medical behavior was stimulated by the desire for interests, issues including excessive examination, overtreatment and extra prescription kept occurring, while the scientific and standardized treatment principle was broken. Although the health administrative department issued the clinical pathway, medical treatment is a highly professional and differentiated work, and individual medical personnel has very large discretion, so the standardization of medical behavior cannot do without the self-discipline of medical institutions and medical workers. How to inspire the self-consciousness of medical institutions and workers has always been the research topic in China's medical reform industry. The model adopted by the research object effectively stimulates the motivation of medical institutions and workers to take scientific and reasonable measures to treat patients. On the premise of curing patients, the less medical expenses are spent, the more surplus medical insurance will have, and the more funds medical institutions will retain. Then medical institutions and workers will study how to "cure the disease and spend less". This can be used for reference for medical institutions to standardize medical behavior.

6.4.4.4 Providing a new way to do a good job of public health services

The main purpose of public health services is to conduct health interventions to improve people's health. It goes against our original intention if the medical and health institutions become too commercialized and focused on profit maximization. In the past, the medical institutions tried to seek more patients with the purpose of increasing profit, and now the medical alliance has made a difference. Led by such alliance association, the institutions will pour more material, financial and human resources into public health services, disease screening, health intervention and other fields, so as to encourage everyone to focus more on his health and prevent and detect diseases in an early stage. This provides a new impetus and way to do a good job of public health services.

6.4.4.5 Providing options for scientific utilization of county medical resources

The current situation of uneven distribution and utilization rate of medical resources in the county has been plaguing governments and health administrative departments at all levels. The new operation model of Medical Treatment Combination Model makes county medical institutions actively think about how to solve this problem, take a series of measures to make more scientific and reasonable use of the resources, and promote more scientific and balanced allocation of the resources.

6.5 Future research

6.5.1 Research on the regulation of medical institutions in the context of integrated medical institutions

After changing the profit-seeking direction of medical institutions, some experts, government officials and patients put forward the problem of how to prevent the institutions from not doing their best to treat patients. This puts forward the proposition of carrying out comprehensive supervision of medical institutions in the context of integrated medical institutions, which will be an important act to build an external environment for the healthy operation of the Medical Treatment Combination Model. To implement the new model, DC County has taken some regulatory measures, but a supervision system for the new model has not yet been completely established, which still needs to be studied and discussed by relevant experts and scholars.

6.5.2 Research on medical behavior norms in the context of changes in payment method of medical insurance

In the past payment method of medical insurance, medical institutions profited from treating patients and persuading patients to pay with medical insurance, so the institutions would guide patients to make excessive consumption. With the change of payment method of medical insurance, as medical institutions receive the whole medical insurance in advance, in the process of providing medical services to patients, the institutions will avoid unnecessary medical practice and try to save medical expenses, which may “shrink” the service items and content in the medical process. Still, how to regulate and supervise medical behavior needs to be considered and studied by managers and researchers at all levels.

6.5.3 Research on regulating the use and supervision of medical security funds

After the change of the payment method of medical security funds, there are great differences in the scientific and reasonable use and supervision of medical insurance. How to carry out scientific and effective supervision is a challenging topic for managers and scholars, which needs to be studied and explored.

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Annex A

Table A.1 Representative definitions of stakeholder

Date	Author	Stakeholder definition
1963	Stanford Research Institute	Those groups without whose support the organization would cease to exist
1964	Rhenman	Are depending on the firm in order to achieve their personal goals and on whom the firm is depending for its existence
1965	Ansoff	The objectives of the firm should be derived balancing the conflicting claims of the various 'stakeholders' in the firm... the firm has a responsibility to all of these and must configure its objectives so as to give each a measure of satisfaction.
1971	Ahl stedt & Jahnukaine	Driven by their own interests and goals are participants in a firm, and thus depending on it and for whose sake the firm is depending
1983	Freeman & Red	Wide: can affect the achievements of an organization's objectives to who is affected by the achievement of an organization's objectives Narrow: on which the organization is dependent for its continual survival
1984	Freeman	Can affect or is affected by the achievements of the organization's objectives
1987	Cornel & Shapiro	'Claimants' who have 'Contracts'
1988	Freeman & Gilbert	Can affect or is affected by business
1989	Bowie	Without whose support the organization would cease to exist
	Alkhafaji	Groups to whom the corporation is responsible
	Carroll	Asserts to have one or more of these kinds of stakes, which range from an interest to a right (legal or moral) to ownership or legal title to the company's assets or property
1990	Freeman & Ewan	Contract holders
1991	Low	All those who have an interest in the firm's survival
	Miller & Lewis	Stakeholders are people who can help or hurt the corporation
	Savage et al.	Have an interest in the actions of an organization and have the ability to influence it
	Thompson, Partick & Smith	In 'relationship with an organization'
1992	Hill & Jones	Constituents who have a legitimate claim on the firm . . . established through the existence of an exchange relationship. They supply 'the firm with critical resources (contributions) and in exchange each expects its interests to be satisfied (by inducements)'

	Palgrave et al.	Those whose welfare is tied with a company
1993	Brenner	Having some legitimate, non-trivial relationship with an organization (such as) exchange transactions, action impacts, and moral responsibilities
	Carroll	Individuals or groups with which business interacts who have a stake or vested interest in the firm. Asserts to have or may have more of the kinds of stakes in business...may be affected or affect power and legitimacy
	Starik	Any naturally occurring entity that affects or is affected by organizational performance
1994	Clarkson	Bear some form of risk as a result of having invested some sort of capital, human or financial, something of value, in a firm . . . [or] . . . are placed at risk as a result of a firm's activities
	Freeman	Participants in 'the human process of joint value creation'
	Langtry	The firm is significantly responsible for their well-being or they hold a moral or legal claim on the firm
1995	Mahoney	Passive stakeholders who have a moral claim on the company not to infringe liberties or inflict harm and active stakeholders those whose claims are more in the nature of welfare rights
	Schlossberger	Investors who provide specific capital or opportunity capital to a business
	Starik	Can and are making their actual stakes known...or might be influenced by, or are potentially influencers of, some organization whether or not this influence is perceived or known
1995	Wicks, Gilbert, Freeman & Blair Blair	Interact with and give meaning and definition to the corporation All parties who have contributed inputs to the enterprise and who, as a result, have at risk investments that are highly specialized to the enterprise

	Brenner	Are or which could impact or be impacted by the firm organization
	Calton Lad	Legitimate claims
	Clarkson	Have, or claim, ownership rights, or interests in a corporation and its activities. Invest in the form of valuable assets (human assets or financial assets) in the firm and shoulder certain kinds of risks, or maybe put on the brink of risk because of the firm's actions.
	Donaldson & Preston	Those individuals with explicit or implicit contracts with the firm.
	Jones	Identified through the actual or potential harms and benefits that they experience or anticipate experiencing as a result of the firm's actions or inactions
	Nasi	Groups and individuals with (a) the power to affect the firm's performance and/or (b) a stake in the firm's performance
1996	Grny, Owen & Adams	Any human agency that can be influenced by, or can itself influence, the activities of the organization in question
1997	Carroll Nasi	Any individual or group who affects or is affected by the organization and its processes, activities, and functioning
	Mitchell, Agle & Wood	Legitimate or urgent claim on the corporation or the power to influence the corporation
1998	Argandof ia	Those who have an interest in the company
	Frederick	Everyone in the community who has a stake in what the company does
1999	Clarkson Center for Business Ethics	Parties that have a stake in the corporation: something at risk, and therefore something to gain or lose, as a result of corporate activity
	Leader	Have rights that are internally linked to the constitution of the company, which gives them constitutional powers
	Reed	Those with 'an interest for which a valid normative claim can be advanced'

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2000	Gibson	Those groups or individuals with whom the organization interacts or has interdependencies and any individual or group who can affect or is affected by the actions, decisions, policies, practices, or goals of the organization
	Kochan & Rubinstein	Contribute valued resources...which are put at risk and would experience costs if the firm fails or their relationship with the firm terminates and ... have power over an organization
	Scott & Lane	A direct influence on organizational performance and survival
2001	Hendry	Moral actors ...relationships cannot be reduced to contractual or economic relations. Include social characteristics such as interdependence
	Lampe	Parties affected by an organization
	Ruf et al.	Constituencies who have explicit or implicit contracts with the firm
2002	Cragg	The corporation impacts individuals and collectivities whose interests are thereby affected both negatively and positively
	Orts & Steudler	Participants in a business (who) have some kind of economic stake directly at risk
	Reed	Basic stake, whereby stakes can be that of fair economic opportunity, a stake of authenticity, or one of political equality
	Phillips	Normative stakeholders: for whose benefit should the firm be managed; Derivative stakeholders: potential to affect organization and its normative stakeholders

Source: Freidman & Miles (2006) *Stakeholders Theory and Communication Practice*, Oxford: Oxford University Press, pp.5-9.

Annex B

Summary Table of Interviewees

Name	Gender	Title/Degree	Age	Job/Profession	Way to Interview
				6 government officials	
Luo Zhen	Female	Master's degree	38	Secretary of DC County	One person at a time
Li Wenlin	Male	Master's degree	42	Head of DC County	
Xiao Junfang	Female	Master's degree	46	Deputy Head of DC County	
Fu Weichen	Male	Master's degree	45	Minister of the DC Health Commission	
Zhang Sijia	Female	Master's degree	39	Director of the DC Healthcare Security Bureau	
Liu Qiang	Male	Master's degree	41	Director of the DC Finance Bureau	
				10 suppliers	
Zhao Wenjian	Male	Bachelor's degree		Manager of Haier Biomedical Co., Ltd	One person at a time
Gao Shengfeng	Male	Bachelor's degree		Manager of United Imaging Healthcare Co., Ltd	
Wang Guang	Male	Bachelor's degree		Manager of Maccura Co., Ltd	
Li Tao	Male	Bachelor's degree		Manager of Sinocare Co., Ltd	
Li Hongwei	Male	Bachelor's degree		Manager of Lepu Medical Co., Ltd	
Wang Yehai	Male	Bachelor's degree		Manager of Autobio Co., Ltd	
Ma Lin	Male	Bachelor's degree		Manager of Nanjing Pharmaceutical Company Limited	
Guo Shuai	Male	Bachelor's degree		Manager of Yunnan Baiyao Group Co., Ltd	
Zhou Yaoqing	Male	Bachelor's degree		Manager of Humanwell Healthcare Co., Ltd	
Li Jia	Male	Master's degree		Manager of Shanghai Pharmaceutical Holding. Co., Ltd	

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18 persons in charge of medical institutions (4 from county-level hospitals, 2 from private hospitals and 12 from township healthcare centers)

Zhou Guanglin	Male	Bachelor's degree	49	Director of Fengtang Township Healthcare Center	All persons at a time
Liang Senjian	Male	Bachelor's degree	52	Deputy Director of Fengtang Township Healthcare Center	
Liu Hang	Male	Bachelor's degree	48	Director of Huangji Township Healthcare Center	
Yan Wei	Male	Bachelor's degree	46	Director of Dalian Township Healthcare Center	
Li Jing	Female	Bachelor's degree	48	Director of Gediantownship Healthcare Center	
Li Cong	Male	Junior college degree	45	Director of Liuzhentun Township Healthcare Center	
Liu Biao	Male	Bachelor's degree	48	Director of Wangdian Township Healthcare Center	
Li Shuwei	Male	Junior college degree	35	Director of Bailou Township Healthcare Center	
Shi Honghua	Female	Bachelor's degree	42	Director of Zhuji Township Healthcare Center	
Shi Lei	Male	Bachelor's degree	43	Director of Bankou Township Healthcare Center	
Su Feng	Male	Bachelor's degree	45	Director of Chengguan Township Healthcare Center	
Li Hui	Male	Bachelor's degree	42	Director of Zhangzhuang Township Healthcare Center	
Guo Xia	Female	Junior college degree	46	Director of Huahe Township Healthcare Center	
Wang Guoqing	Male	Bachelor's degree	48	Director of Dawu Township Healthcare Center	
Zhang Liangliang	Male	Junior college degree	41	Director of Zhangming Township Healthcare Center	
Wu Chao	Male	Junior college degree	40	Director of Shuzhuang Township Healthcare Center	
Zheng Yong	Male	Junior college degree	43	Director of Tangzhuang Township Healthcare Center	
Liu Wei	Male	Bachelor's degree	46	Director of Yaoji Township Healthcare Center	
20 medical workers					
Li Bo	Male	Bachelor's degree	43	Department Director	Group interview
Liu Xu	Male	Junior college degree	45	Department Deputy Director	

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			degree		
Cao Qi	Male	Bachelor's degree	46	Attending Doctor	
Wang Litong	Male	Bachelor's degree	48	Practicing Physician	
Dong Jing	Female	Bachelor's degree	42	Nurse	
Zhang Jianyou	Male	Bachelor's degree	35	Department Director	
Yang Yang	Male	Junior college	36	Attending Doctor	
			degree		
Li Hongmei	Female	Junior college	31	Head Nurse	
			degree		
Li Yan	Male	Bachelor's degree	33	Practicing Physician	
Li Jia	Female	Junior college	36	Nurse	
			degree		
Sun Tongchang	Male	Bachelor's degree	34	Practicing Physician	
Zhu Pinghe	Male	Bachelor's degree	37	Attending Doctor	
Chen Dong	Male	Bachelor's degree	31	Practicing Physician	
Ma Lin	Male	Bachelor's degree	30	Practicing Physician	
Wang Zihao	Male	Bachelor's degree	35	Department Director	
Wang Yehai	Male	Bachelor's degree	32	Department Deputy Director	
Guo Qiang	Male	Bachelor's degree	33	Department Director	
Wang Hui	Male	Junior college	31	Attending Doctor	
			degree		
Wang Meng	Male	Junior college	36	Department Deputy Director	
			degree		
Wang Junping	Male	Junior college	31	Practicing Physician	
			degree		
Song Kai	Male	Junior college	32	Department Director	
			degree		
Huang Yongzheng	Male	Junior college	31	Practicing Physician	
			degree		

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					50 patients	
Chang Wu	Male	Junior degree	college	42	Farmer	Group interview
Pan Yahui	Female	Bachelor's degree		35	Worker	
Zhang Kunpeng	Male	Bachelor's degree		32	Waiter	
Zhang Ning	Female	Bachelor's degree		29	Sales clerk	
Zhang Ying	Female	Junior degree	college	35	Bank clerk	
Kang Xiaoyan	Female	Junior degree	college	42	Worker	
Zhu Caiyun	Female	Junior degree	college	41	Waitress	
Wei Jinxiang	Male	Bachelor's degree		42	Teacher	
Guo Dongdong	Male	Bachelor's degree		39	Farmer	
Li Xuechang	Female	Bachelor's degree		29	Technician	
Wang Huifang	Female	Junior degree	college	28	Worker	
Li Yihua	Male	Bachelor's degree		27	Farmer	
Liu Shuangjian	Male	Junior degree	college	32	Teacher	
Yang Guiling	Female	Bachelor's degree		35	Technician	
Zhao Juan	Female	Junior degree	college	31	Waitress	
Wang Haitao	Male	Bachelor's degree		32	Sales clerk	
Liu Xiaoyu	Female	Junior degree	college	31	Bank clerk	
Wang Shaolin	Male	Bachelor's degree		34	Worker	
Wang Xun	Female	Junior degree	college	32	Waitress	

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Yang Qun	Male	Bachelor's degree	33	Teacher
Yao Zengjun	Female	Junior college degree	31	Farmer
Gu Xiaoxiao	Male	Bachelor's degree	30	Technician
Guo Yuchen	Male	Junior college degree	32	Worker
Yu Yangyang	Male	Bachelor's degree	33	Farmer
Ren Gaoxiang	Male	high school degree	31	Teacher
Cui Jingrui	Female	Junior college degree	32	Technician
Liu Zhenling	Female	Bachelor's degree	36	Waitress
Feng Yu	Female	Junior college degree	38	Sales clerk
Zhang Honglan	Female	Bachelor's degree	32	Bank clerk
Zhang Xia	Female	Bachelor's degree	35	Worker
Liu Shuangshuang	Female	Bachelor's degree	33	Waitress
Cui Honglei	Male	Junior college degree	37	Teacher
Su Meng	Female	Junior college degree	42	Farmer
Wang Jun	Male	Junior college degree	45	Technician
Kang Qiunan	Male	Junior college degree	41	Worker
Chen Jiaxuan	Female	Junior college degree	43	Farmer
Su Yaru	Female	Bachelor's degree	46	Teacher
Tang Zhen	Female	Bachelor's degree	41	Technician
Yang Lili	Female	Junior college	40	Waitress

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Zhang Luhua	Male	Junior degree	college	47	Sales clerk
Wu Ningbo	Male	Junior degree	college	41	Bank clerk
Li Huanhuan	Female	Junior degree	college	42	Worker
Ma Shanshan	Female	Junior degree	college	43	Waitress
Jiang Huimin	Female	Junior degree	college	40	Teacher
Cao Hesha	Female	Junior degree	college	42	Farmer
Tian Huili	Female	Junior degree	college	41	Technician
Tan Xuerui	Female	Junior degree	college	42	Worker
You Guodong	Male	Bachelor's degree		43	Farmer
Zhang Xiangbing	Male	Junior degree	college	41	Teacher

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Annex C

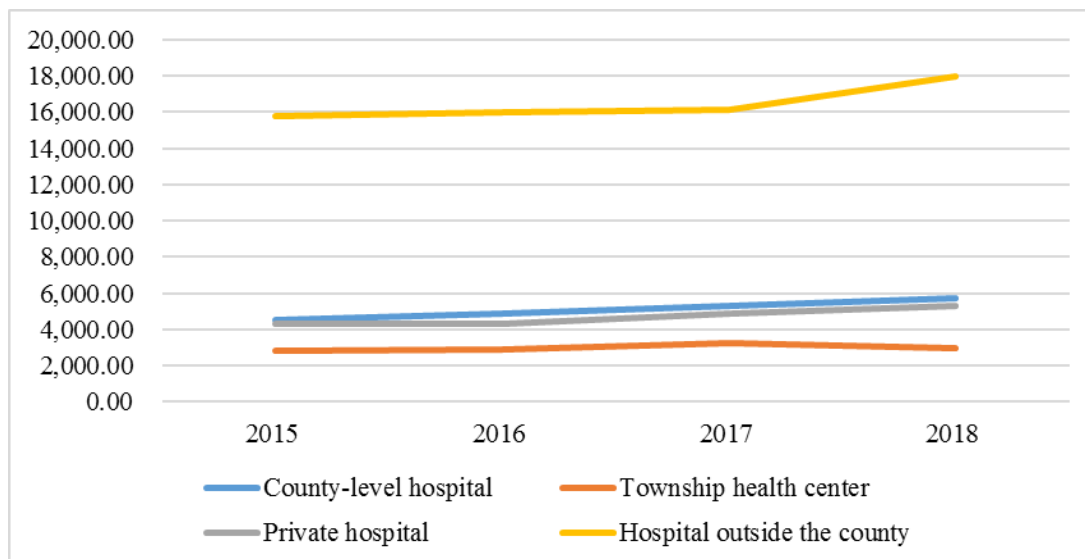


Figure C.1 Comparison of average cost of per hospital stay among various medical institutions in 2015-2018

Source: Medical Reform Office of DC County (2018)

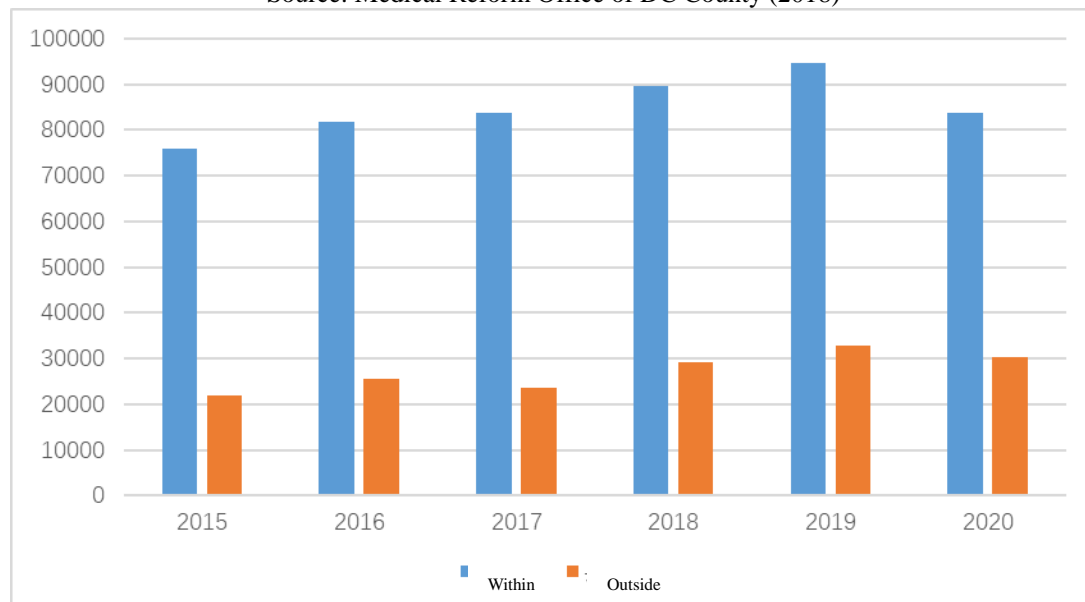


Figure C.2 The total number of patients within and outside DC County from 2015 to 2020

Source: Medical Security Bureau of DC County (2020)

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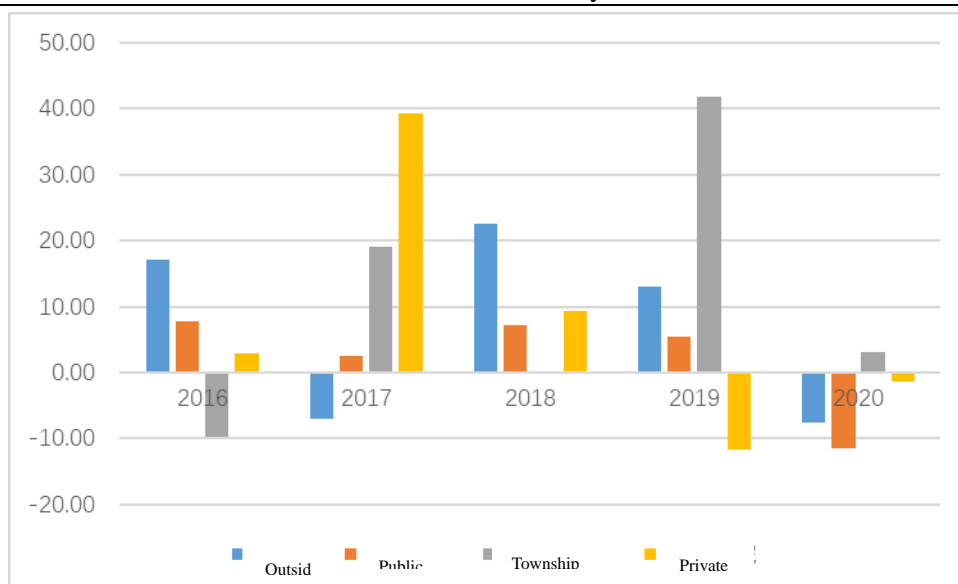


Figure C.3 Comparison of the growth rate of the number of inpatients within and outside DC County from 2016 to 2020 (%)

Source: Medical Security Bureau of DC County (2020)

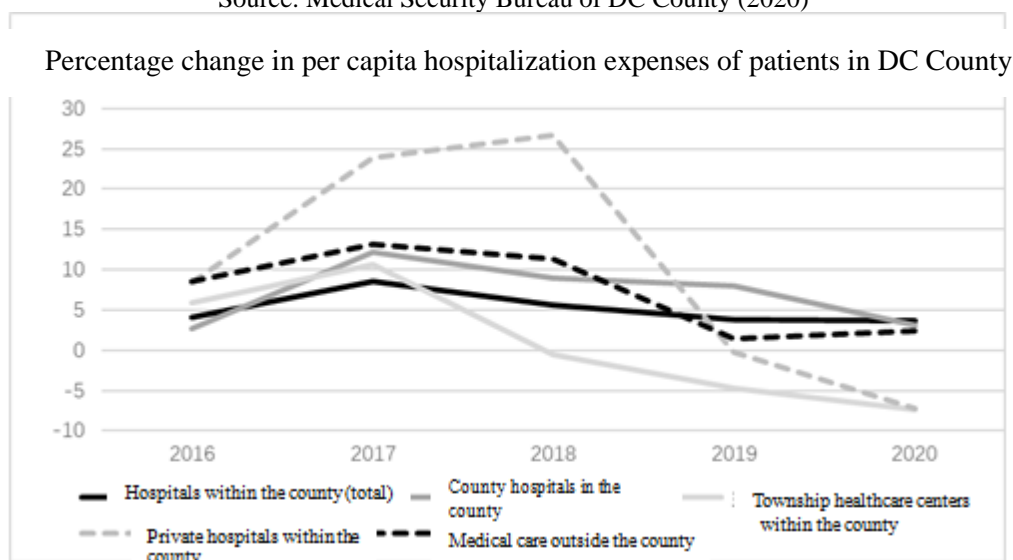


Figure C.4 Percentage change in per capita hospitalization expenses of patients in DC County from 2015 to 2020 (%)

In Figure C.3, “+” means increase; “-” means decrease. The Medical Treatment Combination Model has been implemented since October 2018.

Source: Medical Security Bureau of DC County (2020)

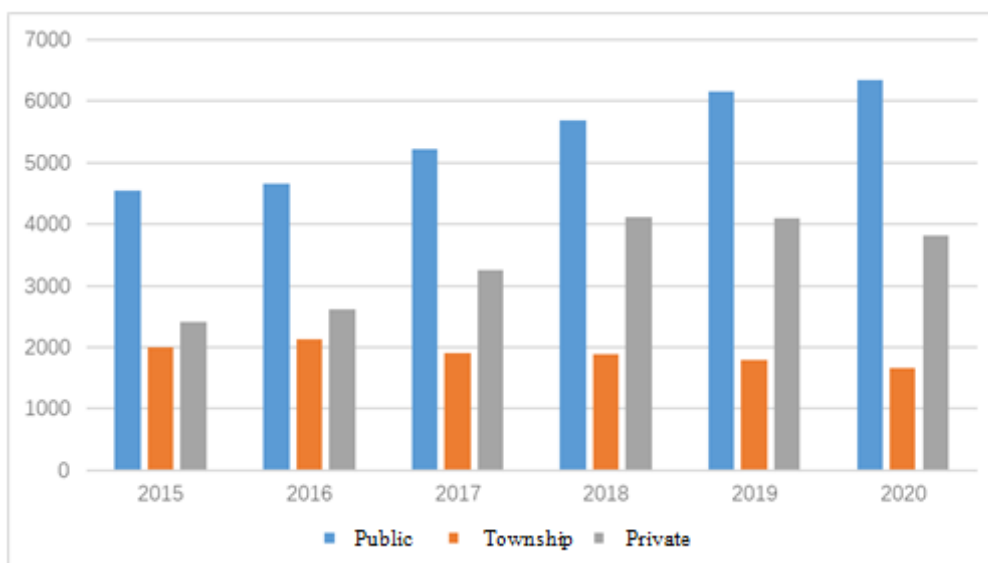


Figure C.5 Per capita hospitalization expenses of patients in DC County from 2015 to 2020

Source: Medical Security Bureau of DC County (2020)