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Comparative Analysis of Health Management and Related Industry Development between China and the US - Taking Cancer Disease as an Example

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Abstract:

Under the background of population aging and a rise of chronic diseases, this paper is based on the different development trends of cancer incidence, mortality, and five-year survival rate in China and the US to compare and analyze the health input, medical infrastructure, medical insurance coverage rate, average household income, and proportion of medical expenditure in the health systems of China and the United States. It was found that the high medical cost in China could not be met by medical insurance alone nowadays. The need for commercial health insurance is growing rapidly. To explore the differences in disease management between the medical and health systems of China and the United States in regard to the system characteristics, industrial development environment, and service mode of the health management service industry in China as well as the US. Additionally, to sort out the development direction of the health management industry in China in line with national conditions.

Keywords: Health management; economic burden; medical insurance.

1. Introduction

People are becoming more aware of their health status, and the need for physical maintenance in the prevention and treatment of diseases is growing due to the social conditions of accelerated aging, the invasion of chronic diseases, and the spread of sub-health states. This also promotes the health management service industry, which is linked to life well-being and coordinated social and economic development, to develop into a strategic sector with significant potential. China is still in the era of policy-driven medical system development and reform, whereas the United States has a well-developed commercial insurance system and market for health management services;. However, China has implemented universal medical insurance, the rapid growth of medical expenses exceeds the existing level of universal medical insurance, and many regional medical insurance funds are on the point of bankruptcy, bringing heavy burden to the fiscal and urban and rural residents [1]. Take cancer, the second leading cause of death in the world, as an example. In recent years, the burden of cancer in the United States has gradually decreased. In contrast, the incidence and mortality of cancer in China have shown an increasing trend, which has overtaken that of the United States [2]. This difference is largely due to the relatively poor level of cancer prevention, screening, and accurate treatment in China‘s health management. Globally, the cancer burden is predicted to rise by 50% between 2020 and 2040 due to the aggravating effects of population aging, with roughly 30 million new instances of cancer projected by then. By comparing the latest cancer profiles and determinants between China and the United States, China can learn from the progress made by the United States in cancer prevention and care, as well as measures to actively cope with population aging; it will be beneficial in lowering China‘s cancer rate [3]. Significant economic costs are also associated with cancer, particularly in nations that are going through social and economic upheaval. The United States‘ „managed care“ medical security operation mechanism serves as the model for many of the policies included in China‘s new health care reform plan. Examples of these policies include pushing commercial insurance companies to take part in price negotiations and social medical insurance management [4]. Therefore, this paper aims to make a comparative analysis of the ideas and industrial develop-

ment of health management between China and the United States. To explore and sort out the development path of the contemporary health management service industry in line with China's national conditions.

2. Healthcare System and Health Management in China and the US

2.1 Healthcare System

In the global health system in 2020, the total health expenditure of the United States was US $4.124 trillion, accounting for 18.8% of GDP, ranking first in the world. China's total health expenditure was 72.17 trillion yuan (US $1.046 trillion at the current exchange rate), accounting for 7.12% of GDP, with a difference of 11.68%. As shown in Figure 1, China's medical and health expenditures are far from adequate.

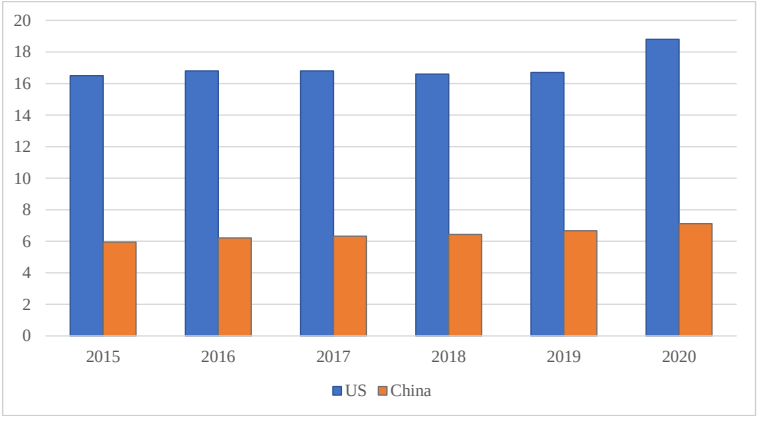

Fig. 1 Health expenditure percentage in GDP (Lindert and OECD Statistics) (Picture credit: Original)

Comparing the global medical facilities, as shown in Figure 2, the number of hospitals per 100,000 people in the United States in 2018 was 1.88, the number of hospital beds per 1,000 population was 2.82, and there were 2.61 doctors and 11.74 nurses per 1,000 people. China has 2.37 hospitals per 100,000 people, 4.67 hospital beds per 1,000 people, 2.59 practicing doctors per 1,000 people, and 2.94 registered nurses per 1,000 people. Compared with developed countries, the number of hospitals per capita in China has reached the standards of developed countries in Europe and the United States; the number of hospital beds has exceeded most of the developed countries in Europe and the United States.; From the perspective of the number of medical staff, the number of practicing doctors in China is lower than that in Europe and the United States, and the number of registered nurses is far lower than that in Western developed countries.

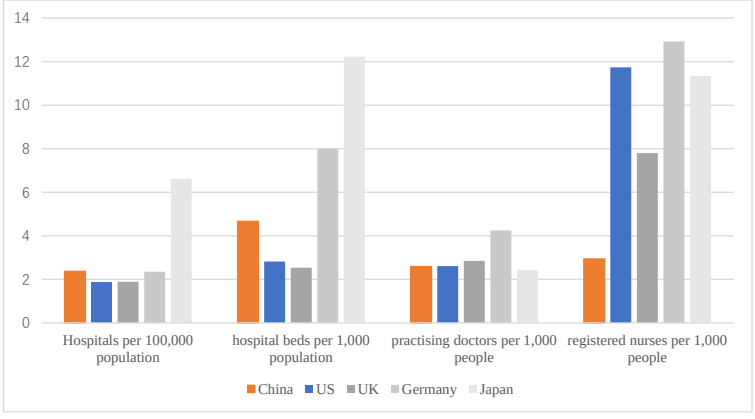

Fig. 2 Health conditions of different countries in 2018 (Data source: NHC of China, American Hospital Association and OECD Statistics) (Picture credit: Original)

2.2 National Health Care

In national health security, medical insurance is an important part. As shown in Figure 3 and Figure 4, in the United States in 2020, medical insurance accounted for 58% of the total health expenditure, and drugs accounted for 15%. However, medical insurance accounts for only 4% of the total expenditure in China, and drugs account for 31%. The 15% share of drug costs in the United States is significantly different from the more than 30% share of drugs in China, which reflects the higher market value of hospital operations, new medical technologies, and medical human resources in the United States. The United States government does not provide universal health insurance, and in the face of expensive medical expenses, it mainly relies on the purchase of commercial health insurance.

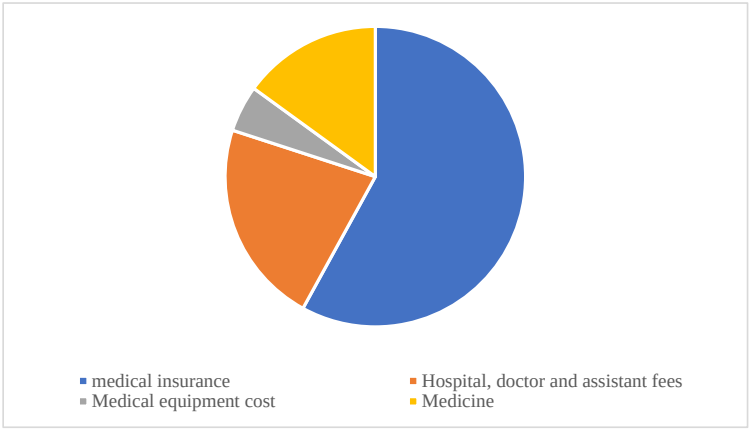

Fig. 3 Type of expenditure proportion in the US (Data source: US National Bureau of Statistics) (Picture credit: Original)

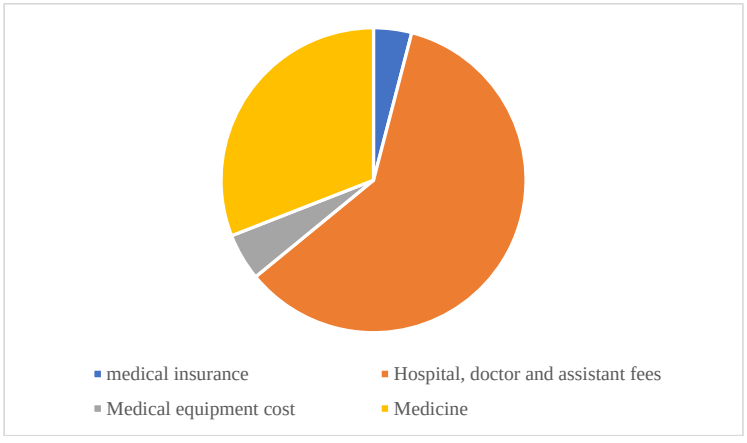

Fig.4 Type of expenditure proportion in China (Data source: NHC of China) (Picture credit: Original)

As shown in Figures 5 and Figure 6, commercial health insurance accounts for a large proportion of medical insurance costs in the United States. Commercial insurance plays a complementary role in China‘s health care system, highlighting the inadequacy of commercial health insurance in China to protect individuals from reasonable medical expenses.

From 2015 to 2020, the average annual growth rate of per capita personal health expenditure in China was 10.27%, which was higher than the growth rate of per capita disposable cash income of residents (7.93%) and per capita cash consumption expenditure (5.52%). The proportion of personal health expenditure in people‘s cash consumption expenditure also increased from 6.67% to 8.32%. The data suggests that China is at risk of catastrophic household health expenditures and that the population is still not adequately secured by basic health insurance [5]. The traditional medical and health industry should be transformed from a consumption industry to a creative industry while generating costs; it will better drive GDP growth. The development of world-class health enterprises and commercial insurance should be supported to fundamentally meet

people's needs for medical insurance to a greater extent. The necessity of commercial health insurance is increasing, which fills the gap left by basic medical insurance [6]. In this regard, many business models in the United States can be used for reference.

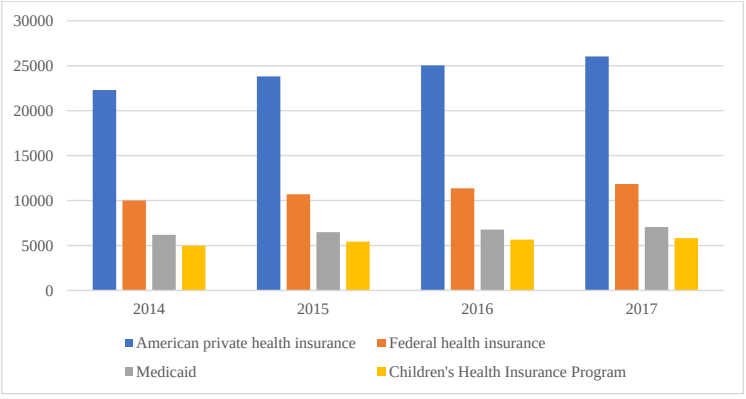

Fig. 5 Medical insurance types in the US (Data source: CDC) (Picture credit: Original)

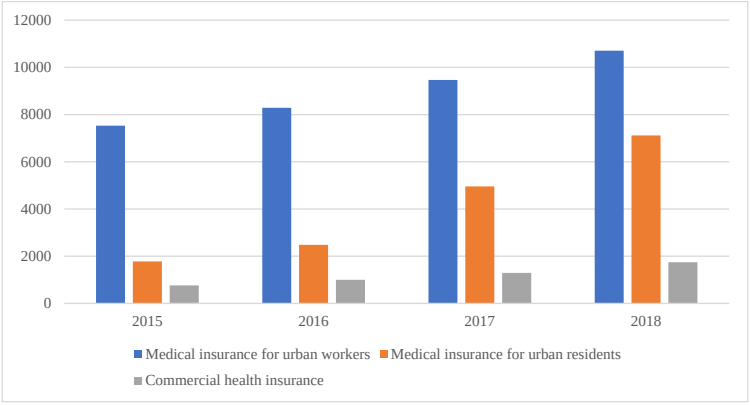

Fig. 6 Medical insurance types in China (Data source: The State Administration of Financial Regulation of China) (Picture credit: Original)

2.3 The Incidence and Management of Cancer Diseases

In the United States, total cancer mortality has dropped by 33% from 1991 to 2020, saving around 3.8 million lives. The mortality rate of lung cancer has significantly decreased as a result of smoking cessation in the United States. Reductions in mortality from prostate, colorectal, and breast cancer have also been attributed to better treatment and increased access to early screening [7]. China had 3 million cancer-related deaths and 4.57 million new cases of the disease in 2020, which ranks first in the world due to its large population base. The incidence of cancer is close to the world average level, but the mortality rate is much higher than the global average level. By comparing the top five cancer types and the 5-year survival rate of each cancer type between China and the United States, as shown in Figures 7, Figure 8, and Figure 9, the root cause of the high cancer mortality in China is the different types of high-incidence cancers, which have a lower cure rate than those in the United States. This suggests that China should focus on cancer prevention and early screening. Cancer treatment depends on early detection. Most of the time, the effect of cancer treatment is directly proportional to the time of detection [8]. In comparison to the average cost of cancer treatment in the United States and China, the average annual treatment cost in China for six common cancers, including gastric and lung cancer, is approximately 68 thousand yuan, which is 2.96 times the

average annual disposable income. This puts a significant burden on medical insurance funds as well as families [9]. The US has a 19.2k disposable personal income, and each person's cancer treatment costs about $600, or 31.25% of disposable personal income. The data once again emphasizes that it is difficult to achieve only medical insurance to cover the cost of serious illness, and high medical costs in China still need to be borne by commercial insurance.

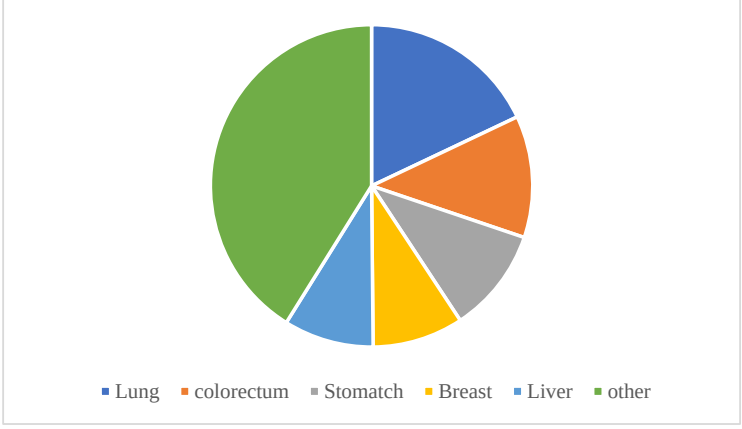

Fig. 7 Top 5 cancer types in terms of new cancer cases in China in 2020 (Data source: IARC) (Picture credit: Original)

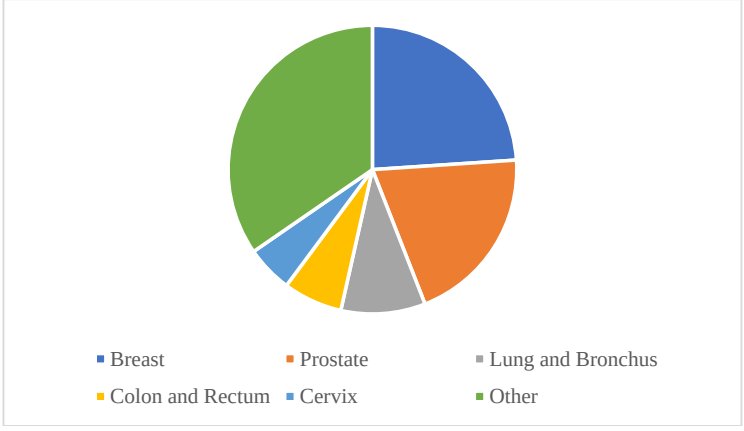

Fig. 8 Top 5 cancer types in terms of new cancer cases in the US in 2020 (Data source: IARC) (Picture credit: Original)

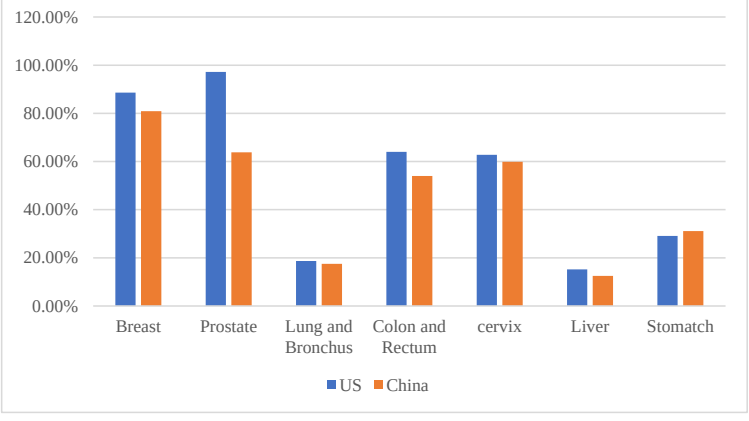

Fig. 9 Five-year survival rates by cancer type in 2009 (Data source: Our World in Data) (Picture credit: Original)

3. The Dilemma of China's Cancer Disease Management

3.1 Background of Economic Development and Population Aging

Globally, China is the nation with the highest proportion of old people. With 176 million elderly people over 65 in 2019, the world's elderly population accounted for more than one-fifth of all people over 65. With the deepening of aging, the number of disabled elderly is also increasing. The intermingling and metamorphosing nature of disability and severe illness readily contributes to the ongoing increase in medical costs. Additionally, the informal care provided by other family members takes up much of the family's working hours, which lowers family income and pushes the family into medical expense poverty [10]. The demand of the elderly for medical services, long-term care, and drugs will increase significantly, which will put higher requirements on medical resources and medical security systems but also provide opportunities for medical technology innovation and medical service model upgrading. According to relevant research findings, Major factors contributing to incremental cancer deaths increased in the adult population and population aging; in both nations, lower case fatality rates were a contributing factor to lower cancer fatalities [2]. Therefore, the remarkable feature of the aging population also exacerbates the difficulty of cancer disease management.

3.2 Current Situation of Coping with Cancer Disease

China's overall cancer incidence and mortality have been rising annually in recent years. The government has implemented several cancer prevention and control programs, and they have made consistent headway in the important domains of system development, early detection and treatment, scientific and technology innovation, and popular science education. Nevertheless, it remains challenging for the current cancer prevention and control system and service capacity to satisfy the population's expanding health requirements. The situation surrounding cancer treatment is still dire; the allocation of health expenditure institutions to large hospitals needs to be reversed and optimized, the role of social financing as a treatment guarantee needs to be fully played, and the stability and sustainability of government health spending are under intense pressure.

3.2.1 Treatment options in medical institutions

Since the 1970s, the treatment of malignant tumors has undergone surgery, chemotherapy, radiotherapy, molecular targeted therapy, and immunotherapy [11].

Nearly 90% of cancer diagnoses in China occur in the middle and late stages of the disease due to the low uptake of cancer screening and even basic health examinations. There was an almost 28 percentage point disparity in the early diagnosis rate between this country and the United States. The outcome is a high rate of distant metastasis and even local recurrence, which is highly detrimental to the therapeutic benefit. For example, EGFR is a gene mutation that results in abnormal cell growth. Studies have shown that 48% of lung cancer patients in China have EGFR gene mutations, while only 23% of lung cancer patients in America have EGFR gene mutations [12]. However, according to national statistics, only 9.6% of non-small cell lung cancer patients in China have been tested for EGFR mutations.

(1) Model of diagnosis and treatment

Multidisciplinary team (MDT) is one of the most advanced cancer treatment concepts recognized internationally. A general consultation is held when needed and once, usually for complex and advanced patients only. Participation is accessible to all, with no institutional assurance. The MDT model is generally applicable to all hospitalized cancer patients during the entire course of treatment. Its members are arranged into teams, the staff is essentially fixed, and it is held every week with an institutional guarantee. This approach reflects the idea of patient-centered treatment and considers the patients' long-term survival. However, only a few elite hospitals in China are attempting to implement this model due to institutional constraints and excessive business volume.

(2) Radiotherapy rate

China's access to radiation equipment in 2015 was less than that of nearly all high-income nations. Furthermore, China has a poor rate of adoption of cutting-edge radiation technologies. Ordinary linear accelerators continue to be the mainstay of radiotherapy equipment in China today. Only 7.9%, 16.5%, and 1.1% of the units can apply VMAT, SBRT, and TOMO technology, but only 70.7%, 50.1%, and 31.5% of the units can apply international conventional 3DCRT, IMRT, and IGRT technology. The efficacy of treatment is adversely affected by flaws in radiation technology.

(3) New drugs and new treatments are introduced

Take lung cancer as an example; only six targeted drugs have been introduced and approved in China, two of which were just approved in 2017. In terms of time, targeted drugs approved by the CFDA in China are 2-3 years later than those approved by the FDA in the United States on average. Almost none of the new drugs developed in the United States since 2014 have been on the market in China. The United States has a more detailed molecular classification of cancer and a greater selection of drugs, which may result in higher cure rates for advanced lung

cancer. From the patient's perspective, the number of new drugs available is limited. In this regard, there is a serious backlog of review and approval, and the update of the medical insurance catalog is slow. Even the drugs that have been approved and listed in China are not reimbursed by medical insurance, which seriously restricts the level of tumor treatment in China [13]

3.2.2 Family expenditure and psychosomatic effect on patients

In China, according to clinical statistical research, more than 87% of the family members of cancer patients have different degrees of anxiety, depression, and other negative emotions, which is higher than that of cancer patients. Moreover, the severe psychological stress reaction of the family members of cancer patients cuts off their social interaction and aggravates the degree of bad psychology.

3.3 Feasible Solutions

In view of the current major diseases such as cancer, effective measures to reduce the economic and mental burden of patients from the perspective of health management are worth exploring. The fundamental concept of health management is preventative medicine, which encompasses fitness, physical examinations, health food, equipment, and other areas. The panel concluded that prevention is better than cure. Through the intervention of risk factors, health management can slow down and delay the development of chronic diseases, rationally allocate medical resources, reduce medical costs, and reduce the burden of public health. As an "upgraded version" of general medical services, health management should also be developed in the direction of individualization and diversification in the future to better achieve the goal of improving people's health index. On the user side, many cutting-edge technologies are moving to civilian use, and more targeted monitoring and management are realized. On the enterprise side, the experience of health management should be improved from aspects such as device products, service methods, and data interaction. In terms of data accumulation, health management will become a major entry point of big data in the medical industry, laying a foundation for diversified services.

From the perspective of the health management industry, the burden of drug costs is large, which comes from the "non-separation of medicine and medicine" phenomenon, low charges for medical services, and allowing medical institutions to conduct price markups when selling drugs. The government should comprehensively start the standardized construction of the centralized drug procurement platform, cooperate with the drug industry to achieve interconnection, and encourage drug retail enterprises to chain operations. In the future, pharmaceutical e-commerce may improve the services of drug enterprises, insurance, patients, and other platform participants and create a complete e-commerce platform ecology for drug purchases.

Regarding the issue of high medical costs, primary personal health management can be developed into personal disease management to allow patients to take care of themselves, reduce their dependence on doctors, and reduce the cost of services. Current personal health management methods mainly provide primary functions such as health monitoring, exercise assistance, health information, and health reminders provided by software and hardware such as mobile phone APP, bracelets, blood pressure meters, blood glucose meters, etc., which have limited help for users' health management. As the world's cutting-edge medical technology continues to mature and move toward public use, personal disease management will be promoted. Based on genetic sequences and comprehensive health monitoring data, individuals will receive more targeted treatment, and artificial intelligence diagnosis and treatment will be made possible. Users will complete the monitoring, evaluation, management, and intervention of chronic diseases and other diseases by themselves, and patients will be members of their medical team. At the same time, commercial insurance will evolve from a single role as an auxiliary to medical insurance into a diversified role as a provider of personalized health management services, a promoter of medical informatization, and a participant in Internet finance. Promoting the expansion, improvement, and steady development of commercial life insurance will not only help to protect people's livelihoods but also be an important part of the national strategy to actively respond to population aging. At the same time, it will promote cooperation between the medical industry (such as hospitals) and commercial health insurance in a standardized and orderly manner.

The combination of advanced medical means and information technology, according to the individual differences of the demand population, the integration of culture, technology, products, services, etc., will derive multi-dimensional and multi-angle service forms and development opportunities. Combining medical means such as detection, assessment, and intervention with Internet means such as smart devices, databases, and information dissemination. Then according to individual differences in service, such as age, regional differences, personal health concept, living and working environment characteristics, surrounding medical facilities, personal medical records, personal biological factors, personal lifestyle, and other characteristics, More personalized health management services such as health information, health management, health examination, health medicine, massage and acupuncture,

and chronic disease management will promote the development of more medical and health enterprises, increase employment, and improve the growth of medical costs.

The final intention of health management for patients with serious diseases [14] It can also serve better. Studies have found that the consistency of the willingness of cancer patients and their family members for life support treatment is not high [15]. In the final year of life, per-patient annualized average expenses were highest if the detection and treatment of cancer are broken down into three stages of care: starting (first year after diagnosis), end-of-life (the year before cancer death), and continuous (the period in between) [16]. Therefore, providing care to meet the individual needs of patients, such as the choice to continue to adhere to treatment or have stable health for the rest of their lives, will also be an important service content.

4. Conclusion

By comparing and analyzing the medical and health investment and medical infrastructure in the medical and health systems of China and America, this paper finds that the basic health conditions in China are poor. In addition, through the medical insurance coverage rate, average household income, and proportion of medical expenditure of people in various countries, it is found that there is a fundamental difference between the US and Chinese health insurance systems. In contrast to private health insurance, which dominates the medical insurance market in America, commercial insurance plays a complementary role in China's government-led medical insurance, highlighting the lack of protection in China's commercial health insurance. Taking China's treatment of cancer, which has the highest morbidity and mortality in the world, as an example, In the context of an aging society in China, health management should pay more attention to the prevention and detection of chronic diseases, combine the diversified development of various fields, and integrate prevention and treatment into personal life to fundamentally solve the problem of patients' medical burden. Although the current personal health management market in China is limited in the content that can be managed, it does not have the extensive functions of American health management companies. Health management mostly involves lifestyle counseling and intervention and disease management. However, with the promotion of relevant policies and the social economy's explosive growth, the demand for the health management industry is increasing. From technology to service, from individuals to groups, China's health management industry has a bright future.

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