# Comparative Analysis of Social-run Medical Institutions and Government-run Medical Institutions in Tianjin

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## Abstract

**OBJECTIVE: The purpose of this study is to analyze the development status and its differences between socially-run medical institutions and government-run medical institutions in Tianjin, and to provide data support for optimizing the allocation of medical resources. METHODS: Statistical data such as the number of health institutions, the number of beds, the number of health technicians, etc. of socially-run medical institutions and government-run medical institutions in Tianjin from 2017 to 2022 were collected through the literature method, and compared and analyzed using the comparative analysis method. RESULTS: The government-run medical institutions in Tianjin have grown steadily, while the socially-run medical institutions have shown fluctuating growth and significant growth in specific areas. The number of other personnel in both types of medical institutions showed a decreasing trend. Conclusion: Social-run medical institutions in Tianjin are facing market competition and operational pressure, and need to strengthen policy guidance and support, optimize staff structure, and promote resource sharing and collaborative development.**

## Keywords

**Tianjin Medical Resource Allocation, Social-run Medical Institutions, Government-run Medical Institutions.**

## 1. Preface

### 1.1. Background of the study

In recent years, with the continuous growth of Tianjin's economy and the continuous improvement of people's quality of life, medical needs have been characterized by diversification and multi-level. Against this background, both socially-run medical institutions and government-run medical institutions in Tianjin have developed significantly.

### 1.2. Significance of the study

This study aims to provide scientific data support for policy makers to further optimize the allocation of medical resources, improve the quality and efficiency of medical services, and also better meet the growing and diversified medical and health care needs of the people.

## 2. Research Objects

### 2.1. Socially-run Medical Institutions

Socially-run medical institutions in this study refer to all kinds of medical institutions invested and run by social capital and managed independently. These institutions usually cover both for-profit and non-profit categories and provide medical services, which, unlike private institutions, emphasize more on social and service nature.

## 2.2. Government-run Medical Institutions

Government-run medical institutions in this study refer to medical institutions invested and established, operated and managed by governments at all levels. These institutions are of a public welfare nature, including public hospitals, and assume the main responsibility for basic medical care and public health services.

# 3. Research Methods

## 3.1. Literature Method

The statistics on the number of health institutions, the number of beds, the number of health technicians and other statistics of socially-run healthcare institutions and government-run healthcare institutions from 2017 to 2022 in this study are all from the Tianjin Statistical Yearbook published by Tianjin Municipal Bureau of Statistics for the period from 2018 to 2023, and the data are authentic and reliable.

## 3.2. Comparative Analysis Method

This study mainly focuses on socially-run medical institutions and government-run medical institutions, and analyzes in depth the development status of socially-run medical institutions and government-run medical institutions, as well as the differences and commonalities in their development trends by comparing their trends and growth rates of various indicators during the period from 2017 to 2022.

# 4. Comparison between Socially-Run and Government-Run Medical Institutions in Tianjin

## 4.1. Comparison of the Number of Health Institutions between Socially-Run And Government-Run Medical Institutions in Tianjin

As can be seen in Figure 1, from 2017 to 2022, the number of government-run health institutions has been growing steadily in general, whereas the number of socially-run health institutions has been showing an upward trend after a slight decline in the initial period. As can be seen in Figure 2, the annual growth rate of government-run health institutions is relatively stable with little fluctuation. In contrast, the growth rate of socially-run health institutions has fluctuated considerably.

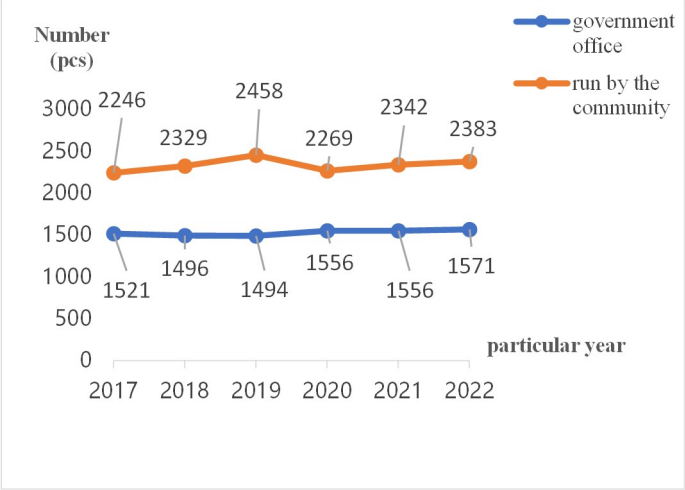


**Figure 1.** Trends in the number of socially-run and government-run health institutions

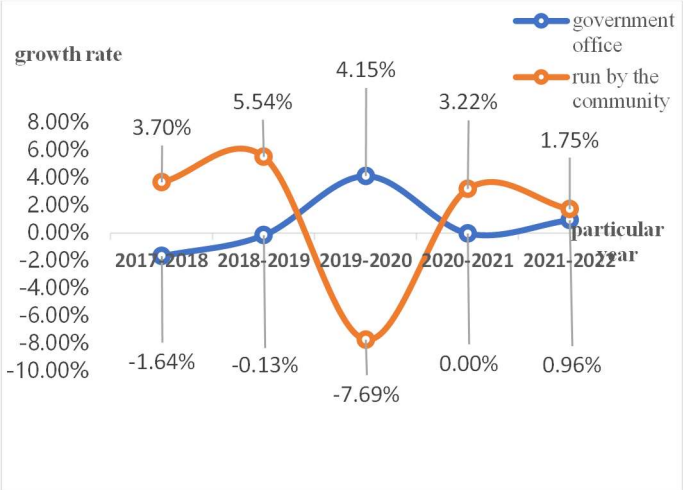


**Figure 2.** Growth rate of the number of social-run and governmental-run health institutions

## 4.2. Comparison of the Number of Beds in Socially-Run and Government-Run Health Institutions in Tianjin

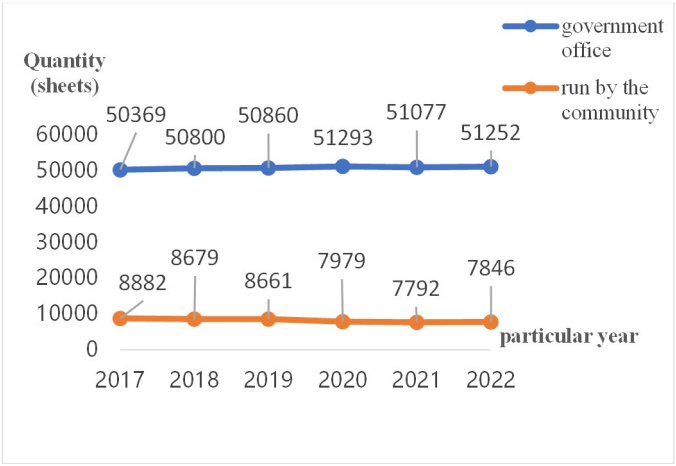


**Figure 3.** Trends in the number of beds in social-run and government-run health institutions

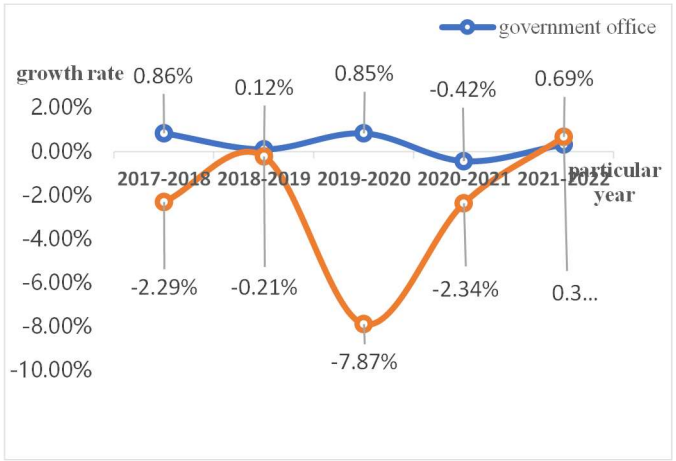


**Figure 4.** Growth rate of the number of beds in socially-run and government-run health institutions

As can be seen in Figure 3, the number of beds in government-run health institutions shows an overall trend of steady growth from 2017 to 2022. In contrast, the number of beds in socially-run health institutions shows a decreasing trend year by year. As can be seen in Figure 4, the

growth rate of the number of beds in government-run health institutions maintains a positive value in most years, whereas the number of beds in social-run is mostly negative, indicating that the number of beds is decreasing.

### 4.3. Comparison of the Number of Health Technicians between Socially-Run and Government-Run Medical Institutions in Tianjin

As can be seen from Figure 5, the number of health technicians in both government-run and socially-run shows a steady upward trend between 2017 and 2022. As can be seen from Figure 6, the growth rate of the social office fluctuates greatly, reaching a maximum of 9.04%; while the growth rate of the government office fluctuates less, and is relatively stable overall.

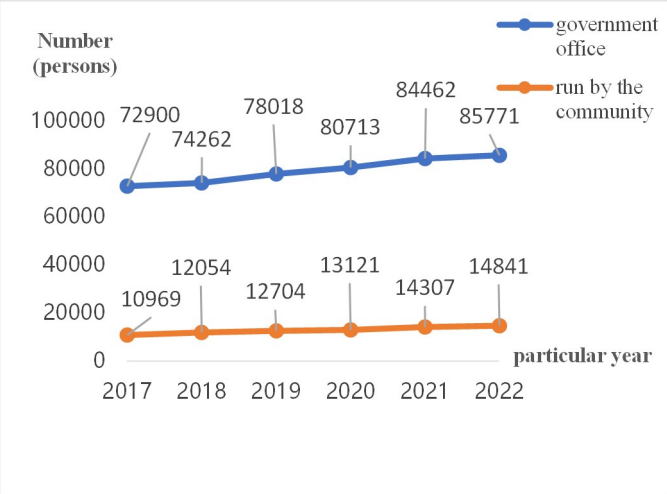


**Figure 5.** Trends in the number of health technicians in social-run and government-run institutions

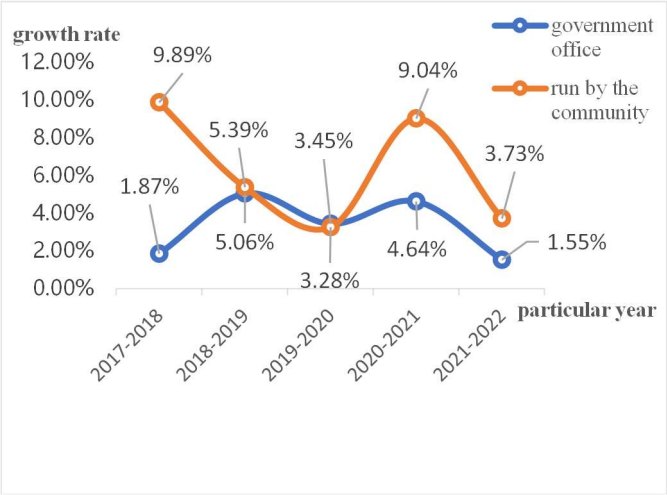


**Figure 6.** Growth rate of the number of health technicians in social-run and government-run institutions

### 4.4. Comparison of the Number of Practicing (Assistant) Physicians between Socially-Run and Government-Run Medical Institutions in Tianjin

As can be seen from Figures 7 and 8, the number of practicing (assistant) physicians in both social-run offices and government-run offices continued to rise between 2017 and 2022, and the growth rate of both social-run offices was greater than that of government-run offices.

However, starting from 2019, the growth rates of the number of practicing (assistant) physicians in both social offices-run and government-run offices show a decreasing trend.

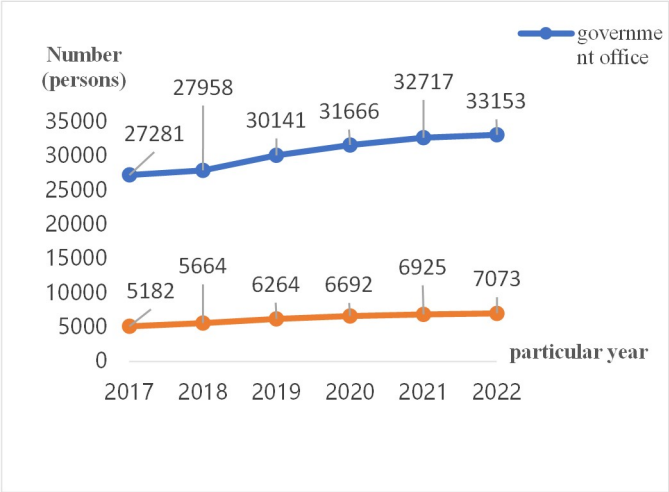


**Figure 7.** Trends in the number of practicing (assistant)physicians in social-run offices and government-run institutions

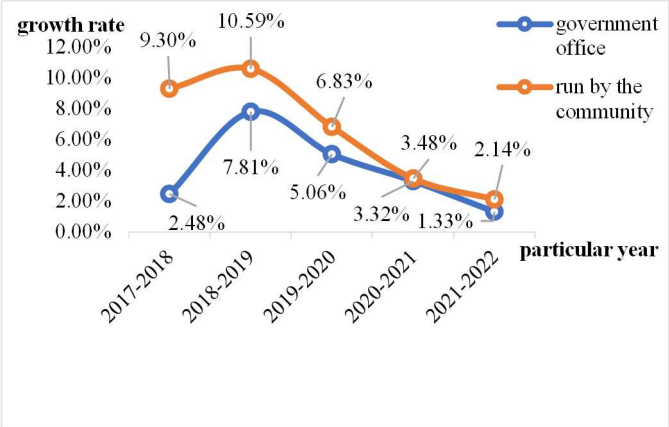


**Figure 8.** Growth rate of the number of practicing (assistant)physicians in government-run offices and social-run institutions

## 4.5. Comparison of the Number of Registered Nurses in Social-run and Government-run Medical Institutions in Tianjin

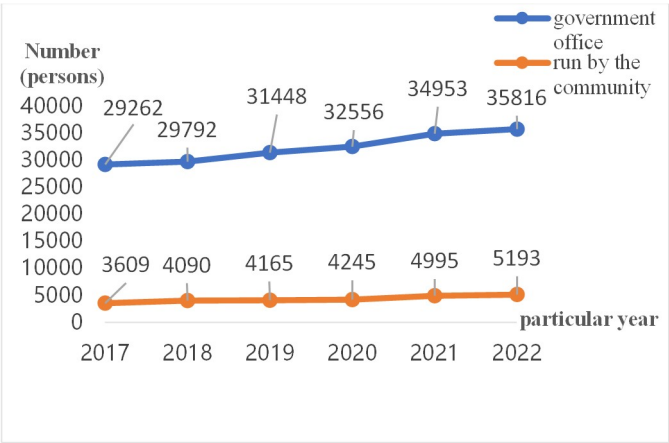


**Figure 9.** Trends in the number of registered nurses in government-run and social-run institutions

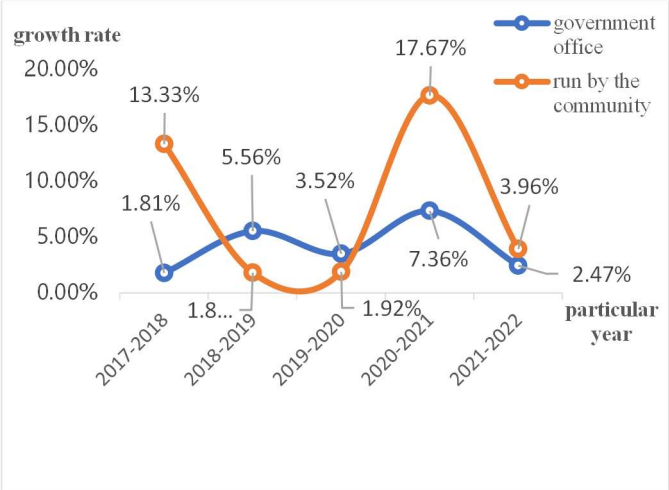


**Figure 10.** Growth rate of the number of registered nurses in government-run and social-run institutions

As can be seen in Figure 9, the number of registered nurses in both government-run and socially-run organizations is on an upward trend. Although the number of both increased, the growth rate of registered nurses in social offices was more significant. As shown in Figure 10, the annual growth rate of government-run registered nurses fluctuates from 1.81% in 2017 to 2.47% in 2022, while social-run decreases from 13.33% to 3.96%.

## 4.6. Comparison of the Number of Pharmacists (Scholars) in Social-run and Government-run Medical Institutions in Tianjin

As can be seen in Figures 11 and 12, the number of pharmacists (scholars) in both government-run and socially-run pharmacies shows a steady growth. The growth rate of the number of government-run pharmacists fluctuates and increases between 2017 and 2022. Although the number of pharmacists in social offices grows more slowly, the growth rate is as high as 13.48% in 2020-2021, which is significantly higher.

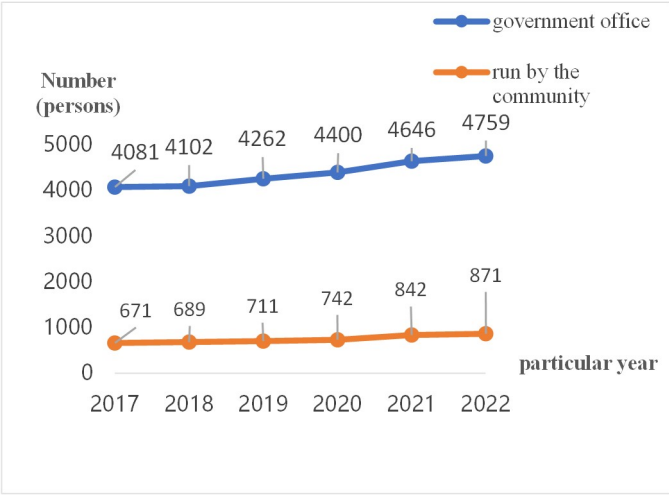


**Figure 11.** Trends in the number of pharmacists in governmental-run and social-run institutions

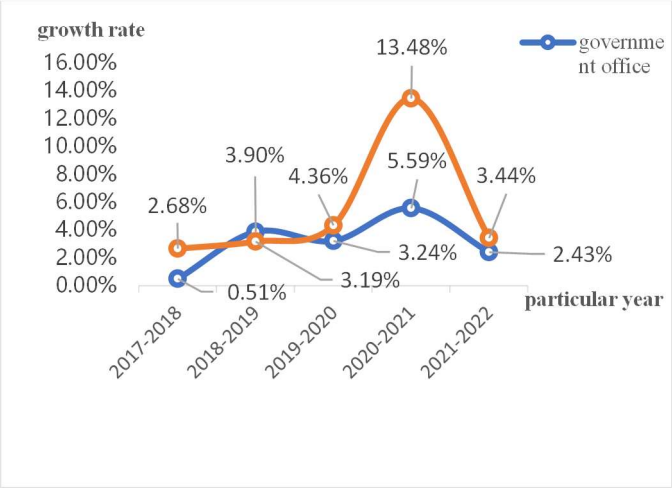


**Figure 12.** Growth rate of the number of pharmacists (doctors) in government-run and social-run institutions

## 4.7. Comparison of the Number of Technicians (Scholar) in Social-Run and Government-Run Medical Institutions in Tianjin

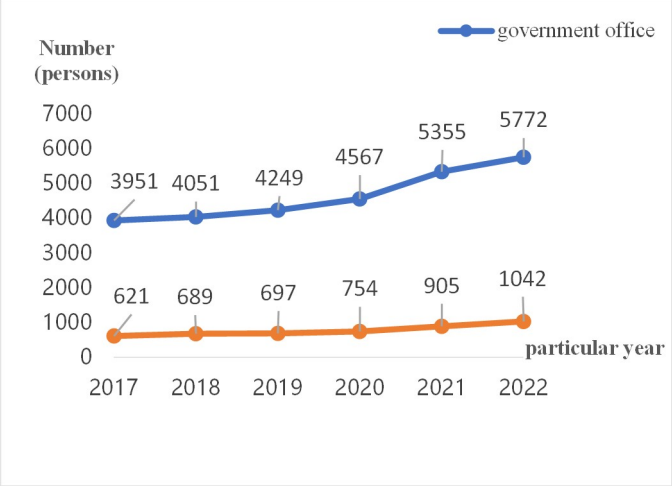


**Figure 13.** Trends in the number of government-run and socially-run technicians (scholar)

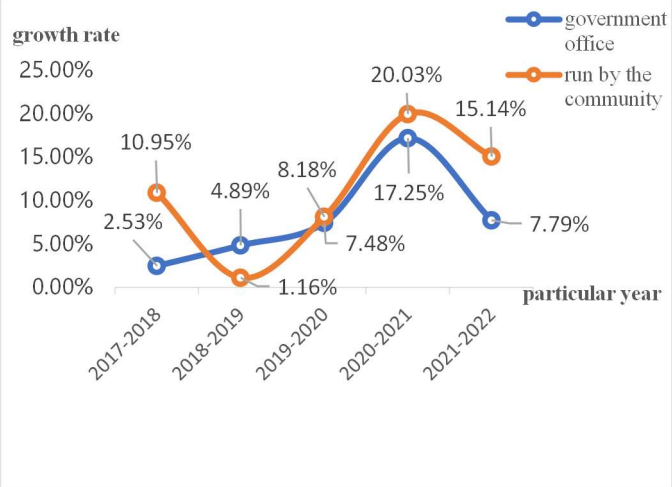


**Figure 14.** Growth rate of the number of government-run and social-run operated technicians(scholar)

As shown in Figures 13 and 14, the number of government-run technicians (scholar) has continued to increase from 2017 to 2022, with a growth rate fluctuating between 2.53% and 17.25%. The number of technicians (scholar) in social organizations also increases year by year, from 621 to 1,042, and the growth rate fluctuates between 1.16% and 20.03%, but the overall growth trend is maintained.

## 4.8. Comparison of the Number of Other Personnel in Social-Run Medical Institutions and Government-Run Medical Institutions in Tianjin

As can be seen from Figure 15, the number of personnel in government-run decreases year by year from 2017 to 2022; while the number of personnel in social-run increases in the initial period, but also shows a decreasing trend in the later period, although the total amount is always less than that in government-run. As can be seen from Figure 16, the growth rate of government offices continues to decline, and has dropped to -7.66% in 2022; the growth rate of social offices fluctuates more, but slightly rebounds to 3.44% in 2022.

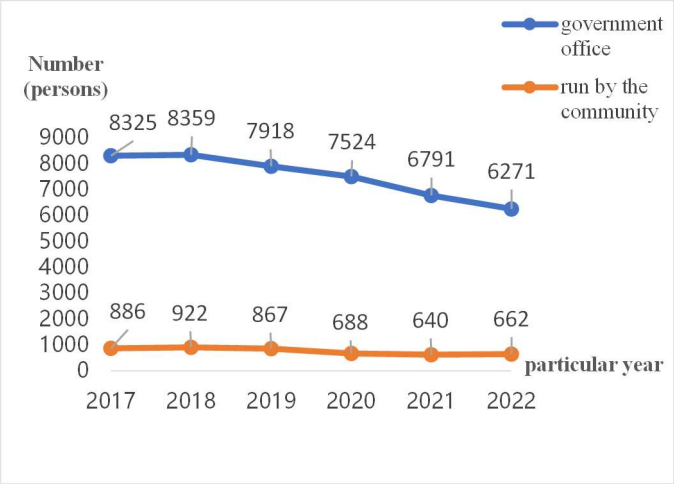


**Figure 15.** Trends in other personnel in governmental-run and social-run institutions

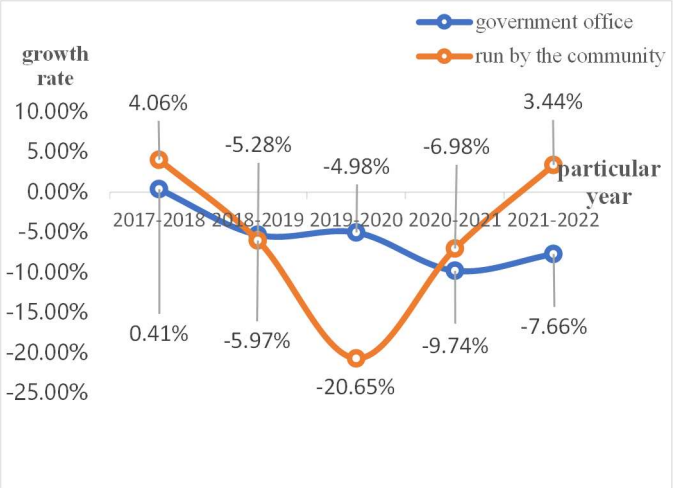


**Figure 16.** Growth rate in the number of other personnel in governmental-run and social-run institutions

## 4.9. Analysis of Resource Allocation Efficiency of Social-run Medical Institutions and Government-run Medical Institutions in Tianjin

### 4.9.1. Analysis of Growth Efficiency

Compound Annual Growth Rate (CAGR) was used to measure the calculation formula:

$$CAGR = \left(\frac{V_{end}}{V_{start}}\right)^{\frac{1}{n}} - 1 \quad (1)$$

Where$V_{start}$ and $V_{end}$denote the beginning and end indicator values respectively, and n=5 is the study period (2017-2022). The results of the main indicators are shown in Table 1.

**Table 1.** Comparison of compound annual growth rates of key indicators (2017-2022)

| Indicator | government office(CAGR) | run by the community(CAGR) | Differential characteristics |
|---|---|---|---|
| Number of health institutions | 0.65% | 1.19% | Social offices are expanding at a faster rate |
| Number of practicing (assistant) physicians | 3.97% | 6.42% | Efficiency advantage of social office talent accumulation |
| Number of beds | 0.35% | -2.45% | Continued strengthening of the scale advantage of the Government Office |

Source: Calculated from Tianjin Statistical Yearbook (2018-2023)

Analysis shows that social medical care is expanding rapidly in terms of institutions and physician resources, but the negative growth in the number of beds exposes the shortcomings of its economy of scale, and attention should be paid to the quality of its services and structural optimization; government-run medical care focuses on improving the quality of internal resources, and the growth rate has slowed down but remained stable.

### 4.9.2. Analysis of Service Effectiveness

The service efficiency indicators (Equations 2-4) are constructed based on the 2022 cross-section data, and the results are measured in Table 3.

$$\text{bedside manner} = \frac{\text{Number of beds}}{\text{Number of registered nurses}} \quad (2)$$

$$(\text{Intensity of physician (assistant) services} = \frac{\text{Number of beds}}{\text{Number of practicing (assistant) physicians}} \quad (3)$$

$$\text{Coverage of technician (bachelor) services} = \frac{\text{Number of beds}}{\text{Number of health technicians}} \quad (4)$$

**Table 2.** Comparison of volatility of growth of key indicators

| Efficiency indicators | government office | run by the community | Coefficient of variation(%) |
|---|---|---|---|
| bedside manner | 1.43:1 | 1.51:1 | +5.6 |
| (Intensity of physician (assistant) services | 1.55 sheets/person | 1.11 sheets/person | -28.4 |
| Coverage of technician (bachelor) services | 8.9 sheets/person | 7.5 sheets/person | -15.7 |

Note: Coefficient of variation = (social office - government office)/government office x 100%

Although social institutions have the flexibility to optimize nursing manpower in market-oriented operations, their efficiency in allocating resources to physicians and technicians lags significantly behind thaSSt of government-run institutions. This gap may be due to the systematic advantages of government-run institutions in institutionalized management, resource integration, and specialized training.

## 5. Conclusion

### 5.1. Tianjin Government-Run Healthcare Institutions Grow Steadily, and Tianjin Socially-Run Healthcare Institutions Show Fluctuating Growth

From 2017 to 2022, government-run healthcare institutions show a steady growth trend. Whether in terms of the number of health institutions, the number of beds, or in terms of a number of dimensions such as the number of health technicians, the number of practicing (assistant) physicians, the number of registered nurses, the number of pharmacists (doctors), and the number of technologists (doctors), government-run medical institutions have shown a steady upward trend. In contrast, although socially-run medical institutions also showed a growth trend during this period, their growth process appeared to be relatively volatile. This may be related to factors such as the industry's regulatory requirements, the competitive market environment and the efficiency of resource allocation, resulting in a less-than-smooth development path.

### 5.2. Remarkable Growth of Tianjin's Socially-Run Medical Institutions in Specific Areas

The growth of Tianjin's socially-run medical institutions in specific areas (e.g., registered nurses, pharmacists, technicians, etc.) is remarkable, and despite the decline in the overall number of beds, their growth in certain service areas has even exceeded that of government-run medical institutions. Among them, private Chinese medicine hospitals and Chinese medicine outpatient clinics in Tianjin, as the main socially-run medical institutions, are smaller in scale, but the number of their medical and nursing staff has been rising year by year, showing a certain trend of growth, which indicates that socially-run medical institutions have a certain potential for development in terms of human resource allocation.

### 5.3. The Number of Other Personnel in Both Government-Run Medical Institutions in Tianjin and Social-Run Medical Institutions in Tianjin Shows a Decreasing Trend

In government-run medical institutions, the number of other personnel shows a decreasing trend year by year from 2017 to 2022. This change may be related to the optimized management and staff restructuring of medical institutions. Similarly, socially-run medical institutions have experienced similar changes in the number of other personnel. Although there was an increase in the initial period, the later period also showed a decreasing trend.

### 5.4. Market Competition and Operational Pressure on Socially-run Medical Institutions in Tianjin

Against the background of the government's increased investment in and support for government-run medical institutions, socially-run medical institutions are facing more intense market competition and operational pressure. In terms of operational pressure, socially-run medical institutions face greater challenges in health supervision.This pressure comes not only from the strong position of government-run healthcare organizations, but also from the people's demand for continuous improvement in the quality and efficiency of healthcare services. In addition, the issue of fairness in resource allocation to primary healthcare organizations in Tianjin may also have an indirect impact on the operation of socially-run

healthcare organizations, as the uneven distribution of resources may limit the room for development of socially-run healthcare organizations.

### 5.5. Differences in Resource Allocation Efficiency between Government-Run Healthcare Institutions in Tianjin and Socially-Run Healthcare Institutions in Tianjin

In terms of growth efficiency, socially-run healthcare institutions have expanded significantly faster than government-run in terms of the number of health institutions and the number of practicing (assistant) physicians, which reflects their market-based flexibility and resource-absorbing capacity. However, the continued negative growth in the number of beds in socially-run medical institutions reveals a lack of economies of scale and a structural imbalance in resources, while government-run maintains the stability of bed resources at a steady rate of growth, underscoring the sustainability of its scale.

In terms of service effectiveness, socially-run medical institutions are slightly better in terms of bed utilization efficiency, but the service intensity of their practicing (assistant) physicians is significantly lower than that of the government-run ones, and the efficiency of medical and nursing synergy is insufficient. In contrast, government-run organizations are more stable in terms of service stability due to resource enhancement and investment.

## 6. Suggestions

### 6.1. Strengthen Policy Guidance and Support to Promote the Stable Development of Social-Run Medical Institutions in Tianjin

The government should reduce the operating costs of social-run medical institutions and enhance their market competitiveness through economic incentives, such as financial subsidies, tax breaks, and financial support. For example, it can learn from foreign experience and provide special loans or low-interest loans for social-run medical institutions to reduce their financial pressure. In addition, health insurance policies should be improved to ensure that socially-run medical institutions can enjoy fair health insurance payments, thereby enhancing their service capacity and attractiveness.

In response to the barriers to access and supervision of socially-run medical institutions, the government should clarify access standards and simplify the approval process, while introducing third-party supervisory forces and strengthening information-based supervision, so as to ensure that the operations of socially-run medical institutions are transparent and compliant[1].In addition, a dynamic assessment mechanism should be established to regularly evaluate the operation of socially-run medical institutions, so that problems can be identified and corrected in a timely manner and the quality of their services can be safeguarded[2].

By strengthening information disclosure, the transparency of socially-run medical organizations can be improved, so that the public can understand the quality of their services and their fees, and social trust can be enhanced. At the same time, the social image and brand influence of socially-run medical institutions can be enhanced through media publicity and patient feedback mechanisms.

### 6.2. Define the Market Positioning of Tianjin's Socially-Run Medical Institutions and Give Full Play to Their Advantages in Specific Fields

Socially-run medical institutions should combine their own advantages and focus on areas such as specialty services and rehabilitation medicine to provide differentiated and personalized medical services and meet the diversified needs of patients. For example, specialist hospitals or special diagnostic and treatment centers, such as oncology treatment, psychological rehabilitation and geriatric care, can be established to fill the market gaps[3].

Socially-run medical institutions should strengthen their cooperation with institutions of higher learning and scientific research organizations, carry out clinical research and technological development, and enhance their professionalism and innovative capacity. Through the introduction of advanced medical technology and equipment, they can improve their diagnosis and treatment level and enhance their competitiveness in specific fields.

Socially-run medical institutions should actively participate in the construction of medical clusters and form complementary relationships with government-run medical institutions through resource sharing, technical collaboration and talent training. For example, in a medical consortium, socially-run medical institutions can take on some of the specialized services, while government-run medical institutions can provide technical support and management experience, so as to jointly enhance the overall efficiency and quality of medical services[4].

### 6.3. Optimize the Staff Structure of Social-Run and Government-Run Medical Institutions in Tianjin and Improve the Quality of Medical Services

Both government-run and social-run medical institutions should attach great importance to the optimization of the staff structure and the reasonable allocation of human resources. This includes strengthening the training and education of medical and nursing staff to improve their professional skills and service level; improving the performance appraisal mechanism to motivate staff to work actively; and establishing a scientific talent selection and appointment system to ensure that outstanding talents can stand out.

At the same time, government-run and socially-run medical institutions should also learn from international advanced experience and give full play to the role of the “multi-point practice” system for physicians. By allowing physicians to practice in more than one medical institution, it promotes the rational flow and optimal allocation of physician resources and injects new vitality into the development of socially run medical institutions[5].In addition, more excellent talents should be attracted and retained through the introduction of high-end talents and the improvement of staff welfare benefits, so as to provide a strong guarantee for the improvement of medical service quality.

### 6.4. Promote the Participation of Tianjin's Social-Run Medical Institutions in the Construction of Healthcare Consortiums to Realize Resource Sharing and Synergistic Development

Currently, studies on healthcare consortiums pay less attention to the relationship patterns and interactions between government-run medical institutions and social-run medical institutions[6].The Government should encourage and support socially-run medical institutions to actively participate in the construction of medical consortia and to establish close cooperative relationships with government-run medical institutions. Through resource sharing, technical collaboration and talent training, they can promote the optimal allocation and efficient use of medical resources and improve the overall efficiency and quality of medical services.

In the construction of the medical alliance, socially-run medical institutions can give full play to their professional advantages in specific fields and provide useful supplementation and support for government-run medical institutions. For example, they can set up specialized diagnosis and treatment centers to undertake the diagnosis and treatment of some complex cases, and at the same time improve their own diagnosis and treatment level through the technical support of government-run medical institutions.

Government-run medical institutions can also provide more technical support and management experience to social-run medical institutions to help them improve their service level and competitiveness. For example, some public health services and community medical services can be outsourced to socially run medical institutions through the purchase of services

by the government, which not only meets the needs of society, but also promotes the development of socially run medical institutions[7].Through this mutually beneficial and win-win cooperation model, we will jointly promote the sustainable and healthy development of healthcare.

## Acknowledgments

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