Research on the Operational Efficiency and Equity of Primary Healthcare Institutions in Guangzhou: Service Status, Existing Bottlenecks, and Development Strategies



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Research Background

1.1 The Strategic Position of Primary Healthcare Institutions

01

WHO Perspective:

The strength of primary care directly determines the efficiency and equity of the entire healthcare system, serving as a key link to achieve Universal Health Coverage (UHC).

02

Healthy China Strategy:

The Outline of the Healthy China 2030 Plan emphasizes the strategic goal of "strengthening primary care," aiming to enhance service capacity and optimize resource allocation at the grassroots level.

1.2 Status of Primary Healthcare Reform in Guangzhou

01

Reform Achievements:

Since 2009, primary healthcare resources in Guangzhou have expanded significantly, but allocation efficiency lags behind scale growth, with regional disparities restricting service accessibility.

02

Policy Contexts:

The Guangzhou Healthcare Facilities Layout Plan (2021–2035) (issued in 2024) focuses on upgrading primary healthcare capabilities.

1.2 Status of Primary Healthcare Reform in Guangzhou

03

Real-world Challenges:

*Aging population and the trend toward smaller families intensify service pressure on primary care institutions.

*Key reforms such as tiered diagnosis and treatment and family doctor contract services face implementation resistance.

2

Research Objectives

Objectives:

01

Measure Resource Allocation Equity

Apply the Lorenz curve and Gini coefficient to assess equity from dual dimensions: population distribution and geographical distribution.

02

Quantify Operational Efficiency

Use Data Envelopment Analysis (DEA) to evaluate efficiency, with input indicators (number of beds, on-duty staff) and output indicators (outpatient visits, family doctor contracts) to identify inefficient links.

03

Identify Service Bottlenecks and Development Paths

Analyze service status to uncover capacity bottlenecks, exploring development paths suitable for Guangzhou's primary healthcare institutions to inform policy optimization.

Research implications

Provide a scientific basis for policy making

The results of this study can provide a scientific basis for relevant government departments to formulate primary medical and health policies, and help the government to implement precise policies and optimize the allocation of primary medical resources.

Promote the optimization and upgrading of the primary medical service system

Through quantitative evaluation, the problems and deficiencies in the primary medical service system are discovered, and the transformation of primary medical institutions from "quantity increase" to "quality and efficiency coordination" is promoted, and the optimization and upgrading of the primary medical service system is promoted.

Promote the coordinated development of regional medical and health care

Studying the operational efficiency and fairness of primary medical and health institutions in Guangzhou is helpful to discover regional differences and problems, and promote the coordinated development of medical and health care between regions.

3

Research Subjects and Methods

3.1 Research subjects

Research subjects: A systematic analysis of the status quo and achievements of comprehensive reform in Guangzhou's primary healthcare institutions, including community health service centers/stations and township health centers.

- Policy review of reform of primary healthcare
- Assessing the actual effectiveness of reforms from the dual perspectives of fairness and efficiency
- Systematic analysis of development issues and their causes
- Propose policy recommendations for improving reforms

3.2 Research Methods

Efficiency Analysis

Data Envelopment Analysis (DEA):

Input indicators: beds and healthcare personnel.

Output indicators: outpatient visits, family doctor contracts.

Equity Analysis

The Lorenz curve and Gini coefficient:

Assessing resource distribution equity across population and geographic dimensions.

4

Research Results

4.1 Policy System of Primary Healthcare Reform

Policy evolution

National Level



Direction: Healthy China 2030 Plan Outline emphasizes "strengthening primary care" and tiered diagnosis.

Guangdong Provincial Level



Focus: Medical alliance construction and family doctor services.

Guangzhou City Level



Focus: "Smart Healthcare" informatization and fiscal compensation tilting toward primary care.

4.2 *The total amount of resources has increased significantly, but the structural imbalance and stability problems are prominent*

Table 4-1 Overall situation of community health service centers (stations) and township health centers in Guangzhou from 2009 to 2019

Resource type	Growth (2009 to 2019)	Key questions
Number of institutions	260→356 (37%)	Private community centers accounted for 38% (2019), with uneven public-private resource distribution.
Bed Capacity	3932→5090 (+29%)	The number of beds in township health centers fluctuated greatly (2,512 in 2011→1,892 in 2019)
Healthcare Professionals	9588→17036 (+78%)	The doctor-nurse ratio is only 1:0.9 (2019), lower than that of tertiary hospitals
Fiscal Investment Ratio	18.7%→43.2% (% of total revenue)	Fiscal dependency of community health centers (39%) was lower than that of township health centers (55%).

4.3 *Reform Highlights: Three major innovations lead the country*

Integrated service system

The "Trinity Project" with global coverage

Full coverage of district-level medical network:
Each district is equipped with "1 general hospital, 1 traditional Chinese medicine hospital, 1 maternal and child institution" (100% compliance rate in 2020)

Strong financial support:
Municipal financial direct investment subsidy infrastructure.
The government purchases services to achieve homogeneous management of public and private institutions.

01. Family Doctor Contract Services "Guangzhou Model"

A national benchmark for high-quality contracted services

Innovative Payment Mechanism:
Free package, basic package, personalized package (self-pricing by primary care institutions to meet high-end needs)

National Leading Results:
In 2018, the contracted coverage rate was 35.25% (permanent population) and 71.52% (key population), with a supranational target.

4.3 Reform Highlights:

02. HuaDu One-Yuan Medical Service

Model innovation and burden reduction results

The villagers paid a registration fee of 1 yuan, and the medicine was free of charge, reducing the burden by 170 million yuan (2008-2019), which was well received by the villagers.

It has effectively alleviated the problem of "difficult and expensive medical treatment" for rural residents, and improved the utilization rate of primary medical services.

Medical services and health management

The model promotes close ties between primary medical institutions and villagers, and strengthens chronic disease management and health education.

It has improved the health awareness and health level of villagers, and reduced the phenomenon of poverty due to illness and return to poverty due to illness.

Extensibility and policy support

This model has strong generalizability, and the government needs to increase financial investment and policy support, and improve supporting measures.

In the process of promotion, it is necessary to pay attention to local conditions and optimize and adjust according to local conditions.

4.3 Reform Highlights:

03.*ZengCheng Dean-led Hospital Management Model*

Reform of the personnel system and decentralization of autonomy

The delegation of employment rights, operational authority, and distribution rights has led to a 40% increase in primary service volume (2017-2018), stimulating vitality at the primary level.

Service Improvement & Patient Satisfaction

This model has promoted the improvement of the quality and efficiency of primary medical services, and the satisfaction of patients has been significantly improved.
Primary medical institutions have greatly improved their medical technology level and service attitude.

Replicability and risk prevention

This model has a certain degree of replicability, and it is necessary to pay attention to risk prevention and policy support in the promotion process.
It is necessary to establish and improve the supervision mechanism to prevent the abuse of power and the loss of control of internal management.

4.4 Operational Efficiency Analysis:

01. City-wide efficiency dynamics

Total factor productivity increases

From 2016 to 2018, the total factor productivity of primary healthcare institutions in Guangzhou increased by 4.8%, and the overall efficiency improved.

01

Technical efficiency needs to be improved

The technical efficiency decreased by 1.1%, reflecting the shortcomings of primary healthcare institutions in terms of resource allocation and personnel management.

02

Dynamic regional differences in efficiency

The total factor productivity of Tianhe District and Zengcheng District increased by 13.4% and 12.5% respectively, driven by technological progress.

03

4.4 Operational Efficiency Analysis:

02. *Regional Disparities:*

Difference in efficiency between central and suburban areas

The efficiency of primary medical institutions in the central urban area is relatively high, mainly due to the advantages of talents, technology and other resources.

Primary medical institutions in the suburbs are inefficient and face bottlenecks such as talent shortage and insufficient equipment.

Differences in the efficiency of different types of institutions

The efficiency of community health service centers is generally higher than that of township health centers, mainly due to the high population density and full utilization of resources.

Township health centers have played an important role in serving rural residents, but they face greater challenges in improving efficiency.

Key factors for efficiency improvement

Talent team construction, equipment renewal, and information construction are the key factors to improve the operational efficiency of primary medical institutions.

Strengthening regional cooperation and optimizing resource allocation will help narrow the regional efficiency gap and improve overall operational efficiency.

4.5 Equity Assessment: Gini coefficient matrix analysis

Equity Assessment of HR	Equity Assessment of physical resources	Equity assessment of service accessibility
The Gini coefficient of human resources is 0.142 (relatively fair) in the population distribution dimension and 0.477 in the geographical distribution dimension, which is unfair. There are a large number of excellent medical talents in the core urban area, while the lack of talents in the rural areas affects the fairness of medical services.	The Gini coefficient of material resources is 0.323 (mild inequality) in the population distribution dimension and 0.138 (relatively fair) in the geographical distribution dimension. The medical equipment and facilities in the core urban area are more advanced and complete, while the rural areas are relatively backward, which affects the medical experience of residents.	The Gini coefficient of service accessibility was 0.542(significant inequality) in the population distribution dimension and 0.573 (significant inequality) in the geographical distribution dimension, indicating pronounced gaps in service accessibility across regions.

5

Conclusions and Recommendations

5.1 Conclusion

01. Results & Experience

As typical models of Primary Care medical reform, "HuaDu One-Yuan Medical Service" and "ZengCheng Dean-led Hospital Management Model" provide replicable and generalizable experience for other regions. These results show that Guangzhou has achieved phased results in the construction of the primary healthcare system, laying the foundation for the realization of the "Healthy China 2030" goal.

02. Challenges & Problems

The scale expansion and efficiency improvement are misaligned, the contradiction of geographical equity is prominent, the efficiency of resource allocation lags behind the scale expansion, and the gap between regions is obvious. These problems have restricted the further development of primary healthcare institutions, and affected the satisfaction and trust of residents in primary healthcare services, and effective measures need to be taken to solve them.

5.2 Policy recommendations

01. Precise allocation of resources to Optimize equity

Establish a two-dimensional resource allocation model of "population and geography" to make up for the equipment gap in the northern mountainous areas, optimize resource allocation, and improve resource utilization efficiency. According to the population distribution and geographical conditions, the rational distribution of primary medical and health institutions to ensure the fairness and rationality of resource allocation.

Set a geographic Gini coefficient warning line (less than 0.4) to force tertiary hospitals to sink resources, increase the contract rate, and narrow the gap between regions. Strengthen policy support and resource allocation for remote areas, improve their medical and health conditions, and promote equitable development among regions.

5.2 Policy recommendations

02. Technology Empowerment to Boost Operational Efficiency

Promote the “Zengcheng model” decentralization mechanism, establish a DEA dynamic monitoring platform, optimize the input-output ratio, and improve the operational efficiency of primary care institutions. Strengthen the management of primary medical institutions, improve the performance appraisal mechanism, and improve the work enthusiasm and work efficiency of medical personnel.

Build a big data platform for tripartite linkage of medical services, health insurance, and pharmaceuticals, integrating family doctors, insurance payment, and drug distribution. Leverage informatization to optimize service processes and enhance accessibility.

Summary

Primary healthcare is the cornerstone of Healthy China. Guangzhou's practice shows that balancing efficiency and equity—through policy innovation, technological empowerment, and resource optimization—is key to breaking bottlenecks. We hope this research provides insights for Guangzhou and nationwide primary healthcare reform, contributing to the realization of universal health coverage.

Thank you for your attention !

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