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Main Obstacles and Optimization Measures in the Operation of the Two-Way Referral Mechanism within County-Level Healthcare Communities

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Abstract: *This paper focuses on the two-way referral mechanism within county-level medical consortia, elucidating its core concepts and operational principles. It analyzes the primary obstacles to this mechanism in terms of primary healthcare resource allocation, referral flow patterns, interest coordination, patient trust, and information dissemination. The paper proposes optimization measures, including balanced resource allocation, standardized process management, collaborative interest alignment, trust-building at the primary level, and enhanced information interoperability. The effectiveness of these measures is validated through a case study from Yong'an City, Fujian Province, providing practical references for improving the county-level hierarchical diagnosis and treatment system and ensuring the efficient operation of the two-way referral mechanism.*

Keywords: *County-level medical consortium; Two-way referral; Institutional barriers; Optimization measures; Hierarchical diagnosis and treatment*

1. Introduction

The compact county-level healthcare consortium serves as the core vehicle for implementing the tiered diagnosis and treatment system, with the two-way referral mechanism acting as its pivotal operational component, directly influencing the efficiency of medical resource allocation and service continuity. Currently, prominent issues such as inefficient referral process coordination and uneven resource distribution at the county level hinder the establishment of a healthcare model characterized by "primary care first and coordinated vertical collaboration." Based on local practical experiences, summarizing the development pathways and implementation outcomes of the referral mechanism can provide actionable insights for addressing challenges in county-level healthcare coordination and enhancing public access to medical services.

2. The Connotation of the Bidirectional Referral Mechanism in County-Level Medical Consortiums

2.1 Core Definitions and Their Implications

The two-way referral mechanism within county-level medical consortia is a systematic operational framework established upon the tightly integrated organizational structure of county-level healthcare communities, linking the three-tiered healthcare service networks at the county, township, and village levels. It standardizes patients' upward and downward referrals between different levels of medical institutions. Its core objective is to optimize the allocation and efficient flow of medical resources within the county by clarifying the diagnostic and therapeutic functional roles of each institution, defining the applicable scope and service boundaries for referrals, and ensuring the continuity, coordination, and homogeneity of healthcare services. Guided by medical service demands, this mechanism integrates resources from healthcare, medical insurance, and public health sectors, establishing a division of labor where primary care institutions handle the diagnosis, treatment, and rehabilitation of common and frequently occurring diseases, while county-level hospitals provide emergency and critical care as well as specialized services. It represents a concrete implementation of the hierarchical diagnosis and treatment system in county-level settings, characterized by organizational synergy, standardized processes, resource sharing, and service continuity[1].

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2.2 Basic Operating Principles

2.2.1 Primary Care First-Contact Principle

It is emphasized that primary healthcare institutions serve as the first-line treatment providers for common, frequently occurring, and chronic diseases among residents within county jurisdictions. Patients without clear contraindications are required to receive priority care at township health centers, community health service centers, or village clinics. Non-emergency or non-critical cases not initially treated at the primary level should, in principle, not be directly transferred to county-level hospitals. This approach ensures rational distribution of medical resources through initial triage.

2.2.2 Principle of Tiered Medical Care

Based on the service capacity levels of medical institutions and the complexity of disease diagnosis and treatment, the scope of diseases covered by different tiers of institutions is defined. County-level hospitals focus on the treatment of acute and critical illnesses, consultation for complex cases, and specialized technical services, while primary healthcare institutions concentrate on the diagnosis and treatment of common diseases, postoperative rehabilitation, chronic disease management, and health promotion services. This establishes a well-structured, tiered diagnostic and treatment system where each level performs its specific functions.

2.2.3 Principle of Differential Treatment for Acute and Chronic Conditions

Distinguish the differences in diagnostic and therapeutic requirements between acute and chronic diseases. Patients with acute or critical illnesses are promptly referred through the green channel to county-level hospitals for treatment, and after their condition stabilizes, they are promptly transferred to primary healthcare institutions for subsequent rehabilitation and long-term management. For chronic disease patients, standardized diagnosis, treatment, and health monitoring are entirely managed by primary healthcare institutions throughout the entire process.

2.2.4 Principle of Top-Down and Bottom-Up Coordination

A collaborative mechanism among the three-tier institutional levels (county, township, and village) has been established. County-level hospitals enhance primary healthcare service capabilities through technical guidance, talent deployment, and remote consultations, while primary institutions provide patients with initial screening, referral coordination, and rehabilitation follow-up services to county-level hospitals. This establishes a bidirectional empowerment and closed-loop operational linkage model.

2.2.5 Principle of Standardization and Orderliness

Establish a unified catalog of referral indications, clinical criteria, procedural standards, and responsibility lists, clearly defining the operational requirements and timelines for each step—including referral application, assessment, approval, handover, and information transmission—to ensure that referral practices are conducted in accordance with established protocols and evidence-based guidelines, thereby preventing disorganized referrals and service gaps.

3. The Significance of the Bidirectional Referral Mechanism in County-Level Medical Consortia

3.1 Optimizing the Efficiency of Medical Resource Allocation at the County Level

The two-way referral mechanism within county-level medical consortia clarifies the functional roles and diagnostic/therapeutic responsibilities among tertiary, township, and village-level healthcare institutions, enabling precise allocation of medical resources based on service demands. This prevents excessive concentration of high-quality resources in county-level hospitals, thereby avoiding underutilization and waste, while guiding resources toward primary care levels to address service gaps. The mechanism facilitates cross-institutional sharing of medical equipment, technical expertise, and diagnostic information within the county, reducing redundant infrastructure and resource duplication, and enhancing overall resource utilization efficiency. Through referral and patient diversion, common and chronic disease patients are retained at primary care levels, allowing county-level hospitals to focus on emergency and critical care as well as specialized technical services. This achieves precise alignment between resource allocation and service needs, thereby strengthening the operational efficiency of the county-level healthcare system.

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3.2 Enhancing the Quality and Accessibility of Medical Service Provision

The establishment of a two-way referral mechanism creates a comprehensive service chain covering the entire cycle of "prevention – diagnosis and treatment – rehabilitation – health management," ensuring patients receive continuous and coordinated medical services at various stages of care and avoiding gaps in treatment or redundant examinations caused by poor inter-institutional coordination. Primary healthcare institutions leverage this referral mechanism to obtain technical guidance and resource support from county-level hospitals, continuously enhancing their service capabilities. This enables residents in county areas to access basic medical services such as diagnosis and treatment of common diseases, chronic disease management, and postoperative rehabilitation locally, reducing both healthcare costs and time expenditures while improving the equity and accessibility of medical services[2]. County-level hospitals rapidly admit critically ill patients referred from primary institutions through green channels, shortening response times for emergency care and improving the success rate of severe case management. Simultaneously, by referring patients to rehabilitation services, they extend the service reach, fostering a healthcare model where "minor illnesses are treated locally and major illnesses are managed within the county," thereby comprehensively elevating the quality of medical service delivery at the county level.

3.3 Supporting the Integrated Reform of the "Three Medicals" and the Development of Healthy County Systems

The two-way referral mechanism serves as the core implementation vehicle for the tiered healthcare system at the county level, facilitating coordinated efforts among medical, health insurance, and pharmaceutical policies, thereby providing practical support for the integrated reform of the "three medical sectors." Policies such as differentiated health insurance payments and total payment systems leverage the referral mechanism to guide patients toward rational healthcare utilization, reduce unnecessary expenditures on health insurance funds, and enhance fund efficiency. This mechanism promotes the standardization of medication formularies across medical institutions, centralized procurement and distribution of pharmaceuticals and medical consumables, and standardized development in the pharmaceutical distribution sector. Simultaneously, the two-way referral mechanism strengthens the integration of medical and preventive services by incorporating public health services—including disease prevention, health screening, and chronic disease management—into the entire healthcare process, thereby improving health literacy among county residents and ensuring comprehensive health management for key populations. By optimizing healthcare access, enhancing service capacity, and reducing medical costs, the two-way referral mechanism lays a solid foundation for building healthy counties, provides healthcare support for the implementation of the rural revitalization strategy, and advances the health development goal of "putting people's health at the center."

4. Major obstacles to the operation of the two-way referral mechanism within county-level medical consortia

4.1 Uneven distribution of primary healthcare resources

The allocation of primary healthcare resources is closely related to population distribution and economic development levels, with overall insufficient capacity. In some regions, primary healthcare institutions exhibit significant weaknesses in both hardware facilities and talent reserves, characterized by low educational qualifications and professional title structures among physicians—for instance, the proportion of postgraduate graduates is less than 1%, and those holding senior professional titles account for less than 10%. The situation is more pronounced in remote and underdeveloped areas, where outdated equipment and talent shortages are prevalent; many rural doctors possess only secondary vocational education or lower qualifications, leading to chronic shortages of medical resources that constrain the capacity of primary healthcare institutions to provide adequate services.

4.2 Imbalanced referral patterns between upper and lower levels

Two-way referral exhibits the characteristic of "easier upward than downward": the upward referral process is smooth, whereas downward referral encounters significant resistance, resulting in a "unidirectional flow." The downward referral rate in tertiary hospitals is only approximately 2.20%,

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while the upward referral rate at primary healthcare institutions reaches 7.30%, demonstrating a notable disparity. In rural areas, the implementation of downward referrals is more challenging due to insufficient primary healthcare service capacity and trust, further exacerbating the imbalance in patient flow.

4.3 Lack of Referral Coordination and Incentive Mechanisms

Referral involves the distribution of interests among medical institutions. Without a unified coordination mechanism, higher-level hospitals exhibit insufficient enthusiasm for downward referrals due to considerations of operational efficiency and revenue. Practice has demonstrated that after establishing an interest coordination mechanism, outpatient visits at higher-level hospitals decline while those at primary care facilities increase, indicating that the refinement of such mechanisms plays a pivotal role in promoting bidirectional referrals.

4.4 Insufficient patient trust in primary healthcare institutions

Primary healthcare institutions at the county level lag behind large hospitals in terms of hardware facilities and talent reserves, which constitutes a major obstacle to effective downward referral services. Even in regions where primary institutions have developed sufficient capacity, patients still exhibit a clear preference for reputable tertiary hospitals, resulting in underutilized service potential at the grassroots level. Surveys indicate that 80.77% of patients prioritize medical technical expertise when making referral decisions, while 61.54% emphasize infrastructure conditions. The shortcomings of primary institutions in these aspects directly undermine patient trust and hinder the effective implementation of downward referral systems[3].

4.5 Inadequate bidirectional transmission of diagnostic and therapeutic information

The information systems within county-level medical consortia are predominantly independently developed, lacking unified standards and interoperability, which hinders the sharing of diagnostic and treatment information and increases the complexity of referral processes. Existing platforms primarily focus on recording information for upward referrals, while patient information for downward referrals is incomplete, resulting in a "unidirectional information gap." Literature reviews indicate that among 232 relevant studies, 68 identified platform delays as a significant obstacle. Additionally, communication between primary care physicians and higher-level physicians is inadequate: 58.82% of physicians are unaware of the status of subordinate units, and 52.94% perceive the processes as overly complex, further impeding information transmission and referral efficiency.

5. Optimization Measures for the Two-Way Referral Mechanism in County-Level Medical Consortiums

5.1 Balanced Allocation of Primary Healthcare Resources

Increase government investment in primary healthcare institutions at the county level, scientifically determine the hardware configuration standards for these institutions based on regional population size and service radius, address equipment gaps in remote and economically underdeveloped areas, and prioritize the provision of fundamental diagnostic and therapeutic equipment such as laboratory testing, imaging, and rehabilitation devices. County-level health authorities should establish a coordinated talent allocation mechanism within county-level medical consortia, implement the "county-managed, township-employed; township-hired, village-based" system, and regularly dispatch attending physicians or higher-level professionals from county hospitals to provide on-site services at primary institutions, specifying service durations and task requirements. County-level governments should implement a primary healthcare talent development program to expand the workforce through targeted recruitment, free training, and in-service advanced studies, increasing the proportion of individuals with postgraduate degrees and senior professional titles. County-level governments County-level governments should incorporate rural doctors into the unified training system of county-level medical consortia to enhance their professional diagnostic and treatment capabilities. County-level governments should establish county-level medical resource sharing centers to integrate laboratory testing, imaging, and electrocardiogram (ECG) resources between county hospitals and primary institutions, enabling a remote collaborative model of "township-level examinations and county-level diagnoses" to improve

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resource utilization efficiency.

5.2 Standardize the management of two-way referral processes

Establish a unified county-wide catalog of bidirectional referral diseases and indication criteria, specifying the clinical criteria for upward referral of critical and complex cases, defining the clinical threshold values for downward referral of patients with mild chronic diseases or in recovery phases, and detailing the applicable scope and contraindications for referrals. County-level health authorities should implement a closed-loop referral process of "primary care first — county-level treatment — primary care rehabilitation." Primary care institutions shall issue standardized referral recommendations for patients meeting upward referral criteria, while county-level hospitals shall establish green channels for referrals, reserving no less than 20% of appointment slots and hospital beds for receiving referred patients from primary care facilities. County-level health authorities should simplify referral procedures to ensure prioritized coordination of registration, examinations, and hospitalization. County-level hospitals shall conduct downward referral assessments for patients in stable condition, issuing standardized referral documents containing diagnostic summaries, medication regimens, and rehabilitation plans, specifying follow-up frequency and rehabilitation objectives. Primary care institutions shall provide continuous services in accordance with established protocols.County-level health authorities should establish a referral quality monitoring mechanism, clarifying the responsibilities of all institutions at each level regarding referral assessments, information transfer, and subsequent management, and implement accountability measures for violations such as patient retention or refusal to refer.

5.3 Establish a collaborative interest coordination mechanism

Deepen the integrated reform of tightly-knit county-level medical consortia to achieve unified management of personnel, finance, assets, operations, and information. County-level health authorities should establish an interest distribution system within the medical consortia featuring unified accounting, shared surplus, and shared risk mitigation, with a portion of patient medical revenues transferred upward to primary healthcare institutions and the revenue from patient rehabilitation services transferred downward incorporated into their performance evaluations. Relevant responsible departments refine medical insurance payment incentive policies by implementing differentiated reimbursement rates between primary and county-level hospitals—increasing the reimbursement rate for primary care visits by 10%-20% compared to county-level hospitals—and enforce a continuous calculation of the deductible threshold for referred patients, while raising reimbursement rates for rehabilitation-related medical expenses as stipulated. Develop a performance evaluation system based on the effectiveness of two-way referrals, incorporating indicators such as the primary care first-contact rate, two-way referral rate, rehabilitation referral rate, and patient satisfaction into the assessment framework for medical consortia and all levels of institutions[4]. Evaluation results shall be directly linked to total performance-based salaries, fiscal subsidies, and executive compensation.County-level health authorities should establish a dedicated incentive fund for two-way referrals to reward institutions and individuals who actively coordinate referrals and deliver standardized referral services, while initiating corrective discussions for institutions with inadequate referral implementation.

5.4 Strengthening Trust Building in Primary Healthcare

Implement the Service Capacity Enhancement Project for Primary Healthcare Institutions. County-level hospitals shall assist primary institutions in developing specialized departments through collaborative specialty programs, clinical teaching, and remote guidance, thereby improving the standardized diagnosis and treatment of common diseases, chronic conditions, and patients in recovery phases. County-level health authorities should establish a unified medical quality management system at the county level, standardizing technical protocols for diagnosis and treatment, medical record documentation guidelines, and mutual recognition rules for diagnostic test results within integrated healthcare networks. County-level health authorities should conduct regular quality supervision and evaluations of primary institutions and publicly disclose medical quality data. County-level health authorities should strengthen health education and policy interpretation by disseminating information on tiered healthcare systems and two-way referral policies through family doctor contracting services, community outreach platforms, and online health education channels. Primary healthcare institutions should highlight the service capabilities and clinical advantages of primary healthcare institutions to enhance public awareness of grassroots medical services. Primary healthcare institutions should

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implement the family doctor first-contact responsibility system, expand the coverage of family doctor contracting services, clarify the core role of family doctors in referral assessments, process guidance, and follow-up visits, and establish direct communication mechanisms between family doctors and county-level hospital specialists to enhance patient confidence in healthcare services.

5.5 Establish an efficient information exchange system

Establish a unified county-level medical and health information platform to integrate data resources such as electronic medical records, diagnostic tests, medication prescriptions, and medical insurance settlements from institutions at all levels within the medical consortium. County-level health authorities should standardize data formats and interface specifications to enable real-time information sharing and interoperability across institutions. County-level health authorities should develop a bidirectional referral management module featuring functions including referral application submission, online review, bed reservation, information notification, and full-process traceability. Primary healthcare institutions can directly initiate referral requests through the platform, while county-level hospitals complete evaluations and responses online, ensuring complete documentation of the entire referral process. County-level health authorities should establish a bidirectional diagnostic and treatment information transmission mechanism: when higher-level hospitals refer patients downward, the platform simultaneously sends complete electronic medical records, treatment plans, medication lists, and follow-up recommendations; when primary institutions refer patients upward, they upload initial diagnosis records, test reports, and disease summaries, ensuring seamless continuity of diagnostic and treatment information. County-level health authorities should create an online communication platform for physicians within the medical consortium to facilitate real-time exchanges between primary care providers and specialized physicians at county-level hospitals, enabling timely consultations, treatment plan discussions, and post-referral rehabilitation guidance, thereby streamlining referral procedures and enhancing collaboration efficiency. County-level health authorities should strengthen cybersecurity measures for the information platform, implement robust data security protocols to protect patient privacy and medical information, and conduct regular system maintenance and upgrades to ensure stable platform operation.

6. Case Study Analysis of the Bidirectional Referral Mechanism in County-Level Medical Consortiums

6.1 Case Background

In Yong 'an City, Fujian Province, the Yong' an General Hospital of Sanming City serves as the leading institution, integrating two county-level hospitals, 15 township health centers (community health service centers), and 155 village clinics within the county to establish a tightly-knit county-level medical consortium. Through the framework of five shared responsibilities—responsibility, management, service, development, and benefits—the consortium addresses challenges in the two-way referral system, including institutional mechanisms, resource allocation, and process coordination, thereby enhancing the utilization efficiency of medical resources and improving primary healthcare service capabilities[5].

6.2 Measures for Establishing a Two-Way Referral Mechanism

A Municipal Committee and Municipal Government-led Medical Consortium Management Committee was established to formulate the charter of public hospitals and 21 internal management regulations. The "Dual-Director System" was implemented at grassroots branches, with operational directors appointed to all 14 branches. Talent development was enhanced through expert deployment and on-the-job training for grassroots personnel. Unified management was enforced for personnel, finances, assets, and pharmaceuticals within the medical consortium, with coordinated staffing needs at the grassroots level and an internal talent circulation mechanism established. A unified drug formulary and procurement/distribution system were implemented, along with an integrated financial accounting and "dual-packing" payment model for medical insurance funds. Service lists and referral standards were developed for institutions at all levels, and a regional health management and remote consultation platform was established to achieve information interoperability and mutual recognition of diagnostic test results. A two-way referral green channel was established to streamline referral procedures, while quality control management organizations were integrated to ensure homogeneous medical quality.

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6.3 Operational Outcomes of Two-Way Referral System

In 2022, the coverage rate of standardized electronic health records in the jurisdiction reached 91.93%, the standardized health management rate for individuals aged 65 and above was 65.24%, and the family doctor signing rate among rural populations lifted out of poverty reached 100%. A total of 93 family doctor signing teams were established, with 223 contracted physicians. (See Table 1) The two-way referral process within the medical consortium was optimized, leading to increased rates of initial diagnosis at primary care facilities and referrals for rehabilitation. The service volume at primary healthcare institutions grew, excessive medical treatment in county-level hospitals was curbed, and the efficiency of medical insurance fund utilization improved. This resulted in a healthcare model characterized by "initial diagnosis at primary care, tiered diagnosis and treatment, and two-way referrals," enhancing overall service coordination and continuity within the medical consortium.

Table 1 Core Data Table on the Outcomes of Two-Way Referral Services in Yong'an County Medical Consortium

metric	data
Fraction of coverage of standardized electronic health records	91.93%
Standardized health management rate among individuals aged 65 and above	65.24%
Contract signing rate of family doctors for households that have been lifted out of poverty in rural areas	100%
Number of family doctor contracting teams (units)	93
Number of contracted physicians (personnel)	223

7. Conclusion

The improvement of the two-way referral mechanism within county-level medical consortia is a systematic project that requires addressing multiple challenges including resource allocation, operational mechanisms, and trust-building. Through integrated reforms, standardized workflows, and technological empowerment, efficient resource allocation and continuous service delivery can be achieved. This practical approach provides a viable direction for implementing tiered healthcare systems and enhancing the quality and efficiency of medical services at the county level.

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