China's Primary Healthcare Gatekeeper Model: Comparing China and Germany in a Multi-level Analytical Framework

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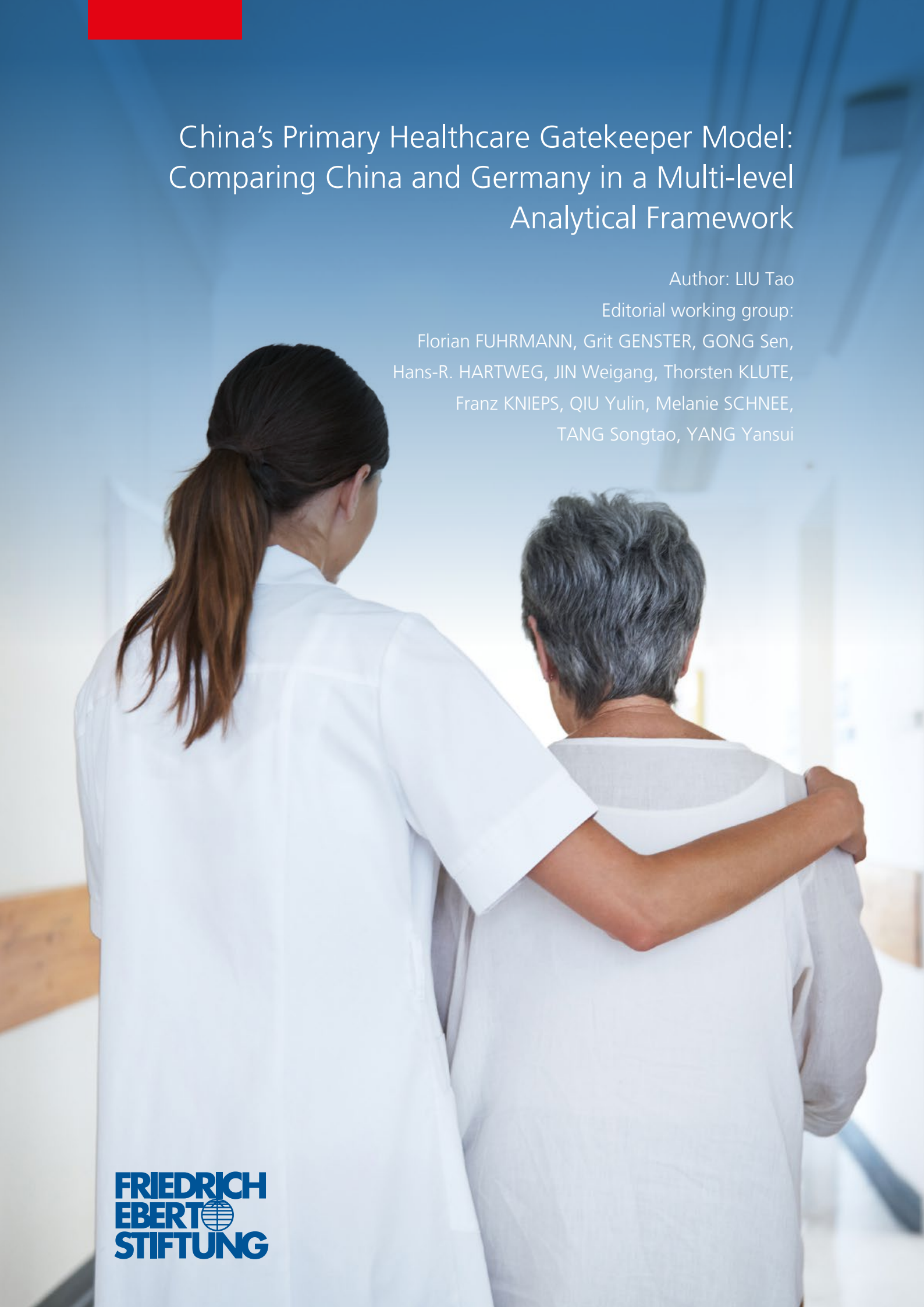

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I. Introduction

A huge challenge facing China's healthcare system is the difficulties and congestion involved in accessing medical care. That is to say, people often choose to seek medical treatment in large and highly reputed hospitals, referred to as 2A and 3A hospitals in the Chinese medical landscape (a 3A hospital is the highest-level hospital in China). In the process of seeking medical treatment, patients often obtain the initial diagnosis in primary medical institutions and then choose to directly seek medical treatment in large high-quality hospitals. This pathway opted for by the population seeking medical treatment combined with China's huge population base has brought about a problem due to congestion and delays in the medical process there. The "congestion index" of large hospitals is often tantamount to a "pain index" on the part of the public seeking medical treatment.

By learning from the policies and experiences of advanced countries, Chinese medical decision-makers and expert groups in the field of health care have long recognised the need to "channel" the medical population through reasonable policy and institutional arrangements, that is, a need to create an appropriate "pyramid-shaped" model for diagnosis and medical treatment: most minor and mild diseases are first to be diagnosed at the grassroots level, while serious diseases and diseases that are difficult to diagnose and treat are to be "channelled" to large higher-level hospitals. Therefore, the existing "inverted pyramid" model for medical treatment in China is to be gradually transformed into a "positive pyramid" model. In this huge transformation to rechannel the medical population, grassroots medical institutions are supposed to play an active role as "gatekeepers", responsible for the daily diagnosis and treatment of minor and mild illnesses without comorbidities and complexities.

However, despite multiple proactive healthcare system reforms implemented in China over the past 20 years to achieve the goals of graded and tiered diagnosis and treatment and primary diagnosis at the grassroots level, there is still a considerable gap between the hoped-for results of the policy and its actual performance. To be precise, the results expected from the series of reforms undertaken in China's healthcare system have not materialised, with some macro data at the national level even indicating the opposite trend: the number of total visits and outpatient visits in large hospitals continues to rise, while the number of total visits and outpatient visits in grassroots medical institutions is still declining. The expectation underlying reform of the healthcare system is that developments will trend in the opposite direction. Some concerns have surfaced: a positive pyramid model in the medical treatment system has not come about, with the inverted pyramid model instead being strengthened against all expectations, and people tending to proceed directly to large hospitals for treatment. It should be noted that the "medical alliance" (yilianti) and "medical community" (yigongti) promoted in China have not significantly reversed the basic approach of people directly seeking medical treatment in large hospitals. Which direction should China opt for in the politically desired health care reform process?

This project is based on three symposiums attended by medical experts from China and Germany. Through a comparison of the medical systems of China and Germany and a comparative international examination of different health models, we shall discuss based on four sub-levels how China's primary healthcare system's "gatekeeper" model should be protected and strengthened.

II. Strengthening of grassroots medical resources and medical treatment capabilities

In Germany, about 80% of diseases are diagnosed and treated through the general practitioner (GP) or primary care model, and only 10-20% of outpatients need to be referred to specialist doctors or hospitals for treatment. Here, family physicians,[1] medical specialists and hospitals in Germany have provided for a well-tuned functional differentiation in the "medical pyramid", where family physicians are responsible for diagnosing and treating general daily diseases, medical specialists are responsible for diseases requiring specialists that family physicians cannot treat, and hospitals are responsible for inpatient treatment and difficult and serious diseases exhibiting comorbidities and complexities (referred to as "diseases involving CC"). In China, although the healthcare system differs significantly from Germany, it has a similar structure in terms of functionality. Grassroots community health service centres, community hospitals and community health service stations form the base of the pyramid, while hospitals at all levels are at the top of the pyramid. In theory, as long as it operates well, China's primary healthcare institutions and hospitals can also practice a governance mode of functional differentiation, where primary healthcare institutions, like German family physicians, are responsible for most daily illnesses, while top-level hospitals are in charge of hospitalisation, major illnesses, and serious diseases involving CC. But the actual situation is far different. In China, the mindset and behavioural model, which is characterised by most citizens gravitating toward hospitals and large hospitals, often leads to a concentration in the flow of patients. For a wide array of reasons, patients often bypass grassroots medical institutions and go directly to large hospitals for treatment.[2]

In China, although it is widely recognised that the aim of future medical reform and development should be to strengthen the medical infrastructure as well as diagnosis and treatment capabilities of grassroots medical service institutions, there is often a disconnect between developments in actual practice and theory. Many provinces and cities still invest enormous sums in large hospitals, and big regional hospitals are still expanding. The prevailing commercial and market-oriented trend in the medical field is still driving the rapid development of advanced hospitals. Here, it is necessary for China's medical policies to provide for true adjustments in direction based on practical needs, putting widely accepted concepts and consensus in theory into actual practice. This means that, in a sense, it is necessary to curb the expansion of large hospitals and allocate more resources and investment in the health sector to grassroots medical service institutions in line with the strategy of "strengthening the grassroots" in the medical field. The aim and objective is not to cultivate a mindset opposing the development of large hospitals, but rather to counter the tendency toward unclear functional boundaries and functional disruptions that come about when large hospitals are expanded. Of course, large hospitals have a decisive advantage when the task is to pool their efforts and resources to solve difficult and serious diseases involving CC, as well as in the field of scientific research and innovation. However, this is precisely why large hospitals need to restrict their "tentacles" and "functions" to their own areas of expertise. The raison d'ętre of a large hospital is to deal with serious, difficult, and rare diseases. It is supposed to leverage its strengths in the field of medical research, but should not pursue its own narrow interests by competing with local grassroots institutions for the right to treat common diseases not involving CC.

In addition to using policy measures to guide more GPs to "settle" at the grassroots level and bolster the medical infrastructure at the grassroots level (including by establishing incentive mechanisms such as salary, achievement bonus, and professional ranking), we believe that special efforts need to be made in three directions: First, just as Germany's statutory health insurance (SHI) schemes play a crucial role in the family physician model in Germany, China's health insurance system can also play a key guiding role. This is not limited to providing

1. The term "family physicians" in English is a direct translation of the German term "Hausärzte", which is similar in meaning to "general practitioners" or "primary care physicians" and "primary care providers" in English.
2. It should be noted that the more moderate order of treatment in Germany is also relative. There are also emergency patients in Germany that bypass the outpatient clinic, and this is not limited to emergency cases treated in the emergency room at night and on weekends. Direct access to emergency care can also strain hospital capacity, and it is important to distinguish between patients who really need emergency care and those who are overusing it.

different reimbursement rates for medical treatment in hospitals at different levels. Health insurance schemes can also play a more active "leveraging" role, such as encouraging residents to sign contracts with grassroots hospitals and clinics,[3] and after signing contracts, applying stricter rules for grassroots primary care and referrals. Furthermore, health insurance schemes can significantly raise reimbursement obstacles for "rule-breakers". Contract awareness not only originates in the establishment of trust relationships, but is also nurtured through compliance with rules. At least a certain degree of "soft coercion" is the starting point in establishing rules. Health insurance can also actively shape "contract awareness" in the medical system.

Second, China's performance assessment of local health care systems needs to be adjusted and transformed. The expansion of large hospitals and increase in the total number of hospital visits and outpatient visits should no longer be regarded as a political achievement. On the contrary, a rational distribution of medical treatment and an increase in primary care, diagnosis and treatment as well as primary outpatient visits should become the objectives in the medical field. A change in the scaling of policy performance can alter policy assessment pathways at the grassroots level.

Third, it is necessary to place 2A and 3A hospitals and primary medical service institutions in an interactive relationship and structure to balance their mutual interests. It is recommended that a health care-related R&D fund and a serious disease and rare disease treatment R&D fund be established to support large hospitals, while compensating for the decline in outpatient visits. Corresponding policies can help large hospitals truly transform themselves into treatment centres for major and serious diseases as well as medical innovation and R&D centres.

3. Physicians in Germany, like other persons, can also establish private clinics for inpatient treatment. The clinics mentioned in the Chinese context are not hospitals with beds for inpatient treatment, however, but rather medical care centres with several employed or self-employed doctors providing outpatient treatment.

III. General practitioner educational training system

At least on the surface, both China and Germany have rigorous educational training systems for general practitioners. Becoming a general practitioner is a long process in both countries. In Germany, after studying at a medical university for six years and three months, it takes five more years of training to become a general practitioner. General medicine is considered a specialisation like any other in the medical field. The pathway for general practitioners in China is no less rigorous than in Germany, with the training of general practitioners in China having gradually evolved into a "5+3" year model over time. This model includes 5 years of undergraduate education, followed by 3 years of specialised training in general medicine. In hospitals and community medical institutions, general practitioners receive comprehensive training, including theoretical knowledge and clinical practice. Germany encourages students to perform internships in family physician institutions and they receive corresponding funding. General practitioners in Germany, like other physicians, must undergo continuing education to acquire required points. This culture of lifelong learning helps doctors to continuously update their knowledge and skills. Chinese general practitioners also need to participate in continuing education and regular audits after completing initial training. Continuing education includes self-study and online learning, requiring physicians to accumulate certain credits every three years and pass exams to ensure that they continuously update their knowledge and skillsets and meet career development requirements. At least in formal terms, both China and Germany's training systems appear to be comprehensive, systematic, and rigorous.

The same structure does not necessarily produce the same outcome, however. After undergoing rigorous education and training as a general practitioner, family physicians in Germany enjoy a high level of professional credibility among the German population. Residents of Germany have a general feeling of trust and confidence in family physicians and general practitioners. Thus far, trust and confidence in general practitioners among the Chinese is relatively low, and is still considerably below the widespread trust that general practitioners enjoy in Germany. What factors have led to such differences between these two countries? Two factors in Germany can explain the high credibility of German general practitioners. Germany has one of the best healthcare systems in the world, and it is widely believed that Germany has the best vocational education system in the world. Luther's concept of Berufspflicht has nurtured a "spirit of workfare" and professional ethics. Therefore, general practitioners who have undergone rigorous vocational education within the healthcare system are readily afforded recognition by the German public, especially outpatients. By way of comparison, the situation in China would appear to be much more complex.

Let's take a closer look at the situation there. First, although the absolute number of general practitioners has grown, the proportion is still low relative to total practicing physicians, and far below the level in developed countries in Europe and America. In this regard, there is a huge gap between China and Germany. In addition, the overall educational training level for general practitioners is by comparison low, with a relatively small proportion of middle and senior professional titles, and an insufficient number of people receiving standardised training and obtaining qualified certificates. Second, there is currently a severe shortage of general practitioners in China, and full-service hospitals lack dedicated general practitioners who have undergone systematic theoretical training in general medicine. In addition, the existing training model for general practitioners needs to be further improved to encourage a rising number of physicians with comprehensive and systematic general practitioner diagnosis and treatment skillsets. Third, although the top-level design and system construction of the tiered diagnosis and treatment system has been instituted in its basic elements, the actual effect is not ideal. The public lacks an adequate understanding of the role played by general practitioners, has insufficient understanding of the family physician contract service system, and shows little enthusiasm when it comes to signing contracts. Even if a contract is signed, one still witnesses a phenomenon where local residents sign a contract, but then fail to make any appointment. Fourth, most domestic research projects do not have specialised programs in general primary care, and the opportunities for general practitioners to apply for research projects are limited and involve considerable red tape. Moreover, general practitioners face constraints in terms of evaluation and upgrading of their professional titles, which seriously affects their career development and a willingness on the part of outstanding medical talents to devote themselves to the field of general medicine. Fifth, social recognition of general practitioners is at a relatively low level, and some residents have miscon-

ceptions regarding grassroots general practitioners. In addition, salary and career development opportunities for general practitioners are lower compared to those of medical specialists, resulting in low levels of job satisfaction and insufficient job attractiveness.

Germany has a long tradition of social autonomy and professional associations, while China lacks an autonomous medical system that is rooted in its own traditions in this field. National decision-making processes and action are therefore particularly important. There is a need for joint action strategies and programs at the national, provincial and municipal levels to promote an improvement in the number and quality of general practitioners. A five-year plan can be designed to increase the number of general practitioners, while encouraging more students who aspire to careers in medicine to opt for the profession of general practitioner through appropriate policies. Under the supervision and promotion of the state, professional norms and guidelines for general practitioners can be established to enhance their perception of professional status. Ultimately, it is necessary to promote the adoption of such a new concept throughout society: the breadth and difficulty of the knowledge structure characterising general practitioners are no less formidable than that of specialists and attending physicians in hospitals. General practitioners require a more extensive knowledge to understand the universal laws of diseases and are gatekeepers with a high sense of professional identification and esteem.

IV. Establishing a rational salary system for general practitioners

In contrast to the similarity in general practitioner training systems, there would appear to be a large gap between China and Germany in salary structures applying to general practitioners. Not only do German family physicians have a high reputation in German society - their profession is also an attractive one, including in terms of income. The income of German family physicians is at the upper-middle level in Germany. Family physicians can often make a good income by opening a private practice, especially if they are able to provide a wide range of medical services, and their earnings potential may be higher. The average annual income of family physicians can even reach the lower bounds of the annual income range for attending doctors in German hospitals. This ample income helps improve the professional prestige of German family physicians. Moreover, family physicians have relatively flexible work arrangements that promote a healthy work-life balance, which to a certain extent boosts the attractiveness of the career. These aspects contrast significantly with comparative parameters in China.

In China, grassroots medical and health service staff not only receive relatively low wages in absolute terms, but also relatively speaking, i. e. the wage gap between grassroots physicians and hospital doctors is very significant. The salaries of doctors in first-tier cities are generally higher than those in second and third-tier cities. Large hospitals are usually concentrated in economically developed first-tier cities, while primary medical institutions are mostly located in second and third-tier cities or rural areas. Large hospitals, especially 3A hospitals, often offer higher salaries due to their high level of medical services and abundant medical resources. However, primary healthcare institutions are usually small in scale and have limited resources, resulting in relatively low income for their medical staff. The professional title and work experience of a physician are important factors affecting salary. Medical experts in large hospitals often have higher professional titles and a wealth of experience, so their incomes are relatively high. In contrast, the professional titles of grassroots medical service personnel are usually lower, and their work experience may also be limited, resulting in lower income. In addition, doctors in large hospitals earn greater income due to their large number of patients and heavy workload, and their performance bonuses are linked to their workload. Although grassroots physicians have long working hours, their performance bonuses may be lower due to service capacity and the number of patients treated by grassroots medical institutions. According to the 2021 China Grassroots Doctor Insight Report, over 80% of grassroots doctors aspire to earn over CNY 10,000 per month, but only 18% of doctors attain this income. This reflects the urgent need for an increase in earnings for grassroots doctors.

Turning to the issue of how to increase the salary of China's primary medical service staff and doctors, it probably would not suffice to rely on a single mechanism. Due to the lack of professional self-management and self-discipline mechanisms in China like those in place in Germany, relying on autonomous self-management within the medical field is not a feasible option. Considering the huge gap between grassroots physicians and medical experts in large hospitals, medical compensation policies launched by the national administrative system are of major importance. China already has a long tradition of special allowances for certain occupations and work in earmarked regions (such as plateau and alpine territories). Therefore, providing special medical service allowances for grassroots medical service staff is an important element if their confidence and morale is to be improved. Medical service staff in second and third-tier cities and rural areas that are further away from the centre of megalopolises should receive higher special job allowances. Furthermore, government investment in medical resources should be shifted towards grassroots medical service institutions, and the proportion of salaries of grassroots medical service staff as a share of total salaries of all medical service staff should be increased for strategic reasons. Furthermore, primary medical service personnel should be appropriately incentivised in areas such as professional title evaluation, resource allocation and project application. In addition to the above measures, the country can also foster the establishment of grassroots medical and health teams by placing a focus on general practitioners. This may mean investing more resources in the training and development of grassroots doctors, improving their professional skills and service quality, and thus obtaining higher salaries through their performance evaluations.

Health insurance can play a crucial role in adjusting the salaries of grassroots medical service staff. Health insurance can incentivise patients to prioritise primary medical services by increasing the reimbursement ratio of primary medical institutions, thereby increasing the

workload and corresponding income sources of primary doctors. Medical insurance can also gradually increase the proportion of services provided by grassroots medical and health institutions in the total amount of medical services along with medical insurance fund payments through reasonable technical adjustment policies, which would also help to increase sources of income for grassroots physicians. Implementation of a tiered medical insurance payment policy for medical institutions at different levels would help ensure that the reimbursement ratio of primary medical institutions is greater than that of higher-level hospitals. This could encourage more outpatients to seek medical treatment at the grassroots level and boost the salaries of primary doctors. In addition, when the annual total budget for health insurance schemes is raised, medical insurance could also focus on primary medical institutions and support primary medical institutions in developing family doctor contract services. For primary medical services, health insurance settlement methods could be optimised, such as payment by disease type, payment by capitation, etc. These methods can help keep costs at reasonable levels and ensure a stable income for primary care doctors. Moreover, it is also necessary to implement performance-pegged salary policies in primary-level medical and health institutions and rationally determine the total amount and level of performance-pegged salaries to ensure that primary-level doctors can receive a reasonable remuneration for their efforts.

V. Establishing a trust system for initial diagnoses in primary care

At present, China's tiered diagnosis and treatment system appears to be stuck in a vicious "retrograde" cycle. The tremendous socio-economic progress that China has made on the road to modernisation would not appear to have automatically brought about enhanced primary diagnosis at the grassroots level, and instead has further distanced China from the "gatekeeper" model of primary healthcare. For example, the enormous ease of mobility brought about by the transportation revolution, especially the rapid spread of high-speed rail, has made it more convenient for residents of China's second and third-tier cities to proceed directly to 3A hospitals in megalopolises for medical treatment. The integration of urban areas has also made medical treatment more congested and difficult. Another example is the reimbursement rate under medical insurance. If China were able to render the reimbursement rate for medical expenses more uniform like Western European countries, more uniform reimbursement rates would also become an incentive for grassroots residents in small and medium-sized cities to directly seek medical treatment in big cities. It is precisely because of the different reimbursement rates for medical treatment at various levels of hospitals that some people are willing to seek medical treatment at the grassroots level. If this constraint is abandoned, a "Pandora's Box" may be opened, causing more people to flock to large hospitals in centre cities to obtain medical treatment. In addition, current efforts to foster "medical community" and "medical alliance" were originally intended to promote information-sharing and rational allocation and flow of medical resources for all levels of hospitals. However, due to different interest patterns, large hospitals still have a strong motivation to "siphon off" patients from the grassroots to their domain in order to satisfy their own interests.

In this field, however, Germany serves as a very different example, having adopted a very contrasting path. In theory, Germany only laid down family physician-centred medical services in the fifth chapter of Social Code (SGBV) 2004, with the professional association of general practitioners Germany (BPA) having been founded on 3 and 4 December 1960 at Hanover Medical Centre[4]. Having begun in 2004, the German family physician model is only 20 years old, however. However, in Germany's not particularly long history of family physicians, German residents have displayed an unusually high level of trust in, and recognition of, these doctors. Overall, among various professions Germans' trust and confidence in doctors ranks first. Trust and confidence in family physicians in Germany is without a doubt related to Germany's rigorous general practitioner training system and world-renowned high-quality vocational educational training system. The better experience of German people in daily medical treatment also consolidates and strengthens trust of Germans in family physicians. In addition to these factors, the "habits" and "culture" formed in the medical field are also reasons explaining Germany's high level of trust in family physicians. These medical-cultural factors are also crucial: Germany's long-standing federalist tradition has contributed to medical centres flourishing in various regions, and Germany does not have a tradition of adulating megalopolises and mega hospitals. On the contrary, Germans place more emphasis on communication with physicians during the process of medical treatment and the positive experience this generates. Moreover, Germans' cultural tendency to abide by laws and respect contractual agreements also has a positive impact on the medical behaviour of ordinary people.

China's medical culture has also evolved in China's particular social and cultural environment, shaping an extremely solid set of habits and customs that influences people's medical behaviour. After the founding of the People's Republic of China, China's development model of concentrating resources to promote the industrialisation of large cities turned large cities into super centres for resource aggregation, so they quite naturally also became medical centres. Since the institution of economic reforms and the open-door policy, strict restrictions on cross-regional movement characterising the past were lifted. Due to the fact that mega hospitals in megalopolises often become centres for medical resources and concentrations of professional talent, people's "rational choice" in seeking medical treatment settles on central hospitals in megalopolises. Once this habit is established, it turns into a fixed behavioural pattern, over time solidifying into an element of Chinese medical culture. A fixed mindset and pattern of behaviour are extremely

4. Please see "60 Jahre Deutscher Hausärzteverband e.V.", available at: https://www.haev.de/fileadmin/user_upload/publikationen/60_Jahre_DHAEV/Chronik_60_Jahre_Deutscher_Hausaerzteverband.pdf.

difficult to change, but this does not mean that China lacks opportunities to promote primary diagnosis at the grassroots level.

Since the formation of culture and habits is affected by existing policy systems and resource allocation mechanisms, changing the institutional settings of social policies and corresponding resource allocation mechanisms can also shape a new culture and lead to new "habits". Culture is never static. This also means that relationships based on trust in primary medical service institutions and primary medical staff are malleable. After a long period of changes in "policy settings" and a process of new medical socialisation, people's medical treatment habits and trust-based relationships may take on a completely new look, allowing a new kind of medical culture to gradually be formed.

Changing relationships based on trust involves various complex factors, but we can simplify this complex issue by breaking it down into two main factors. Firstly, it involves more "hardware"-related institutional factors, especially medical infrastructure, while secondly, it involves "soft" factors such as soft power, soft governance, and cultural attractiveness. Let's first take a look at what changes should be made in terms of hardware-related power.

Consider the following data: According to the 2013 China Health Statistics Yearbook, 75.0% of medical staff working at primary healthcare institutions have a college or vocational education, while only 20% have a bachelor's degree or above; 72.8% of personnel hold junior or lower technical titles, 23.1% have intermediate titles, and only 4.1% hold deputy senior or higher titles. This means that the majority of medical staff in primary healthcare institutions in China have low educational qualifications and professional titles. According to data from the National Bureau of Statistics, as of the end of 2015, general practitioners in China numbered 189,000, accounting for 6.2% of the total number of professional physicians in the country, far below the international level. According to data we have recently reviewed, the educational qualifications and professional titles of medical staff working in primary healthcare institutions have improved, but they are far from meeting the standards required for primary diagnosis at the grassroots level. According to the 2020 China Health Statistics Yearbook, for example, the proportion of medical staff with a bachelor's degree or above working in community health service centres in China was 35.5% in 2019, with only 1.5% having a graduate degree or above. This also means that 64.5% of medical staff in community health service centres have an educational level lower than a bachelor's degree. As of the end of 2022, registered general practitioners in China numbered 463,000. Although a significant increase had taken place compared to 2015, these general practitioners only accounted for 10.4% of the total number of physicians (4.435 million). Overall, the education and professional titles of medical staff working in primary healthcare institutions remain at a relatively low level, and the total number of general practitioners is relatively small. These factors account for the overall weakness of primary healthcare institutions. People's distrust of local primary healthcare institutions can be traced to a rational observation, which is actually commensurate with a "rational choice" for individual actors and individual patients. The development of trust-based relationships is forfeited even before the starting gun.

The deployment of medical infrastructure and human resources is indeed a "hardware-related factor" and is an area that can be influenced by national public policy settings and involvement. If China can formulate a series of "five-year plans" to promote the development of primary healthcare, and use a comprehensive and strategic national plan to train general practitioners, especially through various policy levers such as salary, professional titles, and career promotion, to promote the "placement" of high-quality general practitioners in primary healthcare institutions, then over time the inherent institutional ice will be broken and latent obstacles will be removed. If the policy system determines that medical staff who have worked at the grassroots level can receive special promotion in "green channels" and professional titles" in channels based on their years of service, and if it stipulates that doctors with senior professional titles must have several years of experience in grassroots services, then the current grassroots medical care pattern will definitely take on a completely new look.

In addition to macro level measures, soft power and soft governance at the meso- and micro levels are also very important. Grassroots medical and health institutions in China, especially community hospitals, are generally located near residential areas, making it easy for people to perceive the availability of community hospitals from a spatial layout and visual perspective. The reason why people bypass community hospitals and are still reluctant to seek medical treatment or learn about grassroots medical institutions is ultimately due to a lack of trust in

these institutions. Community medical and health institutions can fully leverage their "spatial visual and layout" advantages near residential areas, no longer just waiting for patients and adopting a passive attitude of "sitting around on call", but actively promoting a community-centred personal health management concept, such as by staging health days or offering free clinic visits. Community medical and health service centres can establish long-term health management plans with individual residents - an advantage that cannot be matched by super-size hospitals. It would be a waste of resources to attempt to establish a medical trust-based relationship with all residents in the short term, as some empirical studies have shown that young and highly educated residents are more likely to avoid primary diagnosis and go directly to large hospitals for treatment. Local primary clinics can first focus on certain core groups, such as chronic disease patients and the elderly. Generally, chronic disease patients and elderly patients devote more attention to their personal health management plans. At the same time, for reasons relating to medication, it is more convenient and faster for patients with hypertension and hyperglycaemia to seek medical treatment at the grassroots level. If the drug supply capacity of grassroots hospitals can be improved, the popularity of this level among chronic disease patients will greatly increase. Starting from a few core groups, the service group can gradually be extended to other residents in the outer circle, until a trust relationship is established with the majority of residents.

Primary medical and health institutions can also make a start by creating a comfortable and convenient medical environment, with special attention being afforded to improving the physical environment of hospitals, such as providing clean, quiet, and comfortable waiting areas and wards to ensure adequate privacy. A good medical environment can help relieve patients' tension and improve the overall medical service experience. The good environment and medical experience created by family doctor clinics in Germany are effective means to improve public trust. Primary medical institutions should cultivate a humanistic caring spirit among medical staff and improve their communication skills and service awareness through training. Medical staff should treat every patient with empathy and provide warm, respectful and patient services so that patients can feel dignified and experience comfort during the medical treatment process. Local primary care, especially personal health management, is very different from medical treatment in large hospitals. A premium is to be placed on good communication, and how words and even gestures and expressions come across is also relevant. Meticulous and considerate care allows patients to receive complete respect, something unimaginable in large congested hospitals. Primary medical staff can provide personalised care plans based on patients' specific conditions and needs. This includes providing detailed diagnoses of the condition, discussion of treatment options, recovery guidance and psychological support to enhance patient engagement and satisfaction. In addition, primary medical service institutions provide continuous care services to discharged patients through home visits, remote monitoring and online consultation. This helps patients continue their recovery in a home environment, reducing the likelihood of readmissions, and improving patients' quality of life.

Enhancing residents' health awareness is a key element to enhancing trust and confidence in primary medical services, and this can be stimulated through the following measures: (1) Health education and publicity: by means of community health lectures, media publicity, online educational resources and other formats popularising health knowledge, improving residents' awareness of common diseases such as hypertension and diabetes, and fostering an understanding of the importance of disease prevention, early diagnosis and treatment. This not only helps residents develop good health habits, but also enhances their understanding and trust in grassroots medical services. (2) Foster and promote participation in health management: Encourage residents to actively participate in their own health management, such as through regular physical examinations, health counselling and disease screening to detect health problems early on. At the same time, grassroots medical institutions can provide personalised health guidance and disease management plans, help residents master the methods for self-management of diseases, and improve patients' satisfaction and trust in grassroots medical services. (3) Establishing health promotion activities: Grassroots medical institutions can collaborate with community organisations to carry out health promotion activities, such as health trails, fitness courses, nutrition workshops, etc., to enhance residents' health awareness and participation. Through these activities, residents can not only acquire health knowledge, but also form social networks within the community to support healthy lifestyles, thereby enhancing the trust and dependence of the entire community on primary medical services.

VI. Application of digital and intelligent technologies

At present, digitalisation and intelligence and all the new technologies associated with these, are rapidly changing the allocation of resources and structural organisation of the medical system, while also profoundly shaping doctor-patient communication and treatment modes within the medical system. In developed countries, digital and intelligent technologies in the healthcare system are playing an increasingly important role. For example, some local projects in Germany are also leveraging the advantages of digital and intelligent technologies to integrate primary healthcare services into a holistic healthcare system, thereby helping counteract a shortage of general practitioners and other medical resources in remote and rural areas. Of course, digitalisation in connection with primary healthcare services cannot replace healthcare professionals, but it is able to support them, while digital solutions (like AI) mesh together with personalised care provided by humans. China can learn from the experiences of developed countries and its own rich tradition in medical practice and harness new digital and intelligent technologies to strengthen the position of "gatekeepers" and "pilots" in primary medical service institutions.

The main digital and intelligent strategies encompass the following eight areas:

1. Promotion of Telemedicine and Online Consultations

In China, primary healthcare institutions are facing issues such as uneven distribution of medical resources and a shortage of professional doctors. The promotion of telemedicine and online consultations can effectively alleviate these problems. Telemedicine platforms allow primary care physicians to communicate in real-time with specialists in urban hospitals to discuss cases and provide patients with more professional medical services. Additionally, online consultation services can reduce the number of times patients need to visit hospitals, lowering transportation costs and time invested, and improving convenience for those seeking medical care. Implementation of telemedicine requires government support, including construction of infrastructure, network coverage, and the adoption of relevant regulations.

2. Establishment of Electronic Health Record Systems

Electronic Health Record (EHR) systems are key to improving the efficiency of primary healthcare services. These systems can integrate patients' medical records, examination results, medication history, and other information, making it easier for doctors to fully understand patients' health conditions. With EHRs, doctors can make more accurate diagnoses and treatments while reducing the repetition of examinations and medication errors. Moreover, EHRs also facilitate the sharing of medical information, improving the continuity of medical services. Establishing an EHR system requires investments in technology and funding, while ensuring data security and protection of privacy.

3. Application of Intelligent Assistive Diagnostic Systems

Intelligent assistive diagnostic systems can enhance the diagnostic capabilities of primary care doctors. These systems are typically based on artificial intelligence technology and can analyse medical images, laboratory results, and other data to assist doctors in identifying potential health issues. Intelligent assistive diagnostic systems not only improve the accuracy of diagnoses, but also shorten the diagnostic time required, thus boosting the efficiency of medical services. In addition, these systems can also provide treatment recommendations to help doctors develop personalised treatment plans. Developing and applying intelligent assistive diagnostic systems requires interdisciplinary cooperation between inter alia medical experts, data scientists and software developers.

4. Implementation of Virtual Health Assistants and Personalised Medical Plans

Virtual health assistants and personalised medical plans are important means to improve the efficiency and quality of primary care services. Virtual health assistants use artificial intelligence technology to provide 24-hour online consultation services, answering health-related questions, and offering preliminary self-diagnosis and treatment suggestions. With natural language processing and machine learning techniques, virtual assistants can understand user questions and provide accurate responses and suggestions. Personalised medical plans based on patients' medical data, lifestyle habits and genetic factors, use big data analysis and machine learning techniques to formulate personalised health management and treatment plans for patients.

5. Innovation of Community Health Networks and Smart Contract Services

Community health networks and smart contract services provide innovative organisational and operational models for primary care services. Through the establishment of digital platforms, community health networks promote the sharing of health information and mutual assistance among residents, enhancing the overall health awareness and self-management ability of the community. Residents can share health experiences, seek health advice, and participate in health activities on the platform, cultivating a community culture of mutual assistance and learning. Using smart contract technology, smart contract services, automating the handling of medical agreements and insurance claims, the administrative burden can be eased and the efficiency and transparency of medical services improved.

6. Utilisation of Medical Big Data Analysis

Medical big data provides valuable information resources for primary healthcare services. By collecting and analysing medical data, primary healthcare institutions can better understand disease trends, patient needs and better plan the use of medical resources. This information helps medical institutions optimise resource allocation and improve service efficiency. Moreover, medical big data analysis can also provide a scientific basis for public health decision-making, preventing the outbreak and spread of diseases. Utilising medical big data requires establishing corresponding mechanisms for data collection, storage and analysis, while ensuring data quality and security.

7. Medical Internet of Things and Intelligent Environmental Monitoring

The Medical Internet of Things (IoT) and intelligent environmental monitoring systems provide new technological means for primary care services. Medical IoT devices, such as smart infusion pumps and remote monitoring devices, enable real-time monitoring and management of patient conditions, enhancing the continuity and safety of medical services. Intelligent environmental monitoring systems can track hospital and clinic conditions like air quality, temperature and humidity, creating a healthy and comfortable medical environment for patients and healthcare workers.

8. Intelligent Drug Development and Patient Engagement Platforms

Intelligent drug development platforms and patient engagement platforms are key factors in driving innovation in primary care services. Intelligent drug development platforms use artificial intelligence and big data technologies to accelerate the drug development process, providing more effective treatment options for primary care. Patient engagement platforms enable patients to actively participate in their treatment process, enhancing the personalisation and satisfaction with treatment.

VII. Conclusion

From an international perspective, it is evident that different countries have different policies, strategies and implementation plans when it comes to primary care. Some countries such as the United Kingdom have implemented a "mandatory gatekeeping" system, where patients must first go through primary care before they can be transferred to other hospitals for treatment. Germany's medical system is relatively flexible, allowing patients to have a certain degree of autonomy in their choices, but it encourages patients to see their family physicians first. To promote primary care in China, a combination of multiple institutional arrangements and soft power is also advisable.

This paper likens the reform of China's primary healthcare system to the metaphor of "a high-performance electric car", where the strengthening of grassroots medical resources and service capabilities, the perfection of the general practitioner training system, the establishment of a reasonable remuneration system for general practitioners, and the establishment of a trust system for primary care consultations together comprise the four sturdy and stable wheels of the vehicle. Application of digital and intelligent technologies serves as the dynamic engine that powers the car. Only when these four wheels and the engine rotate in harmony can the electric vehicle of primary care be successfully launched and move forward at high speed.

Strengthening grassroots medical resources and service capabilities is the chassis that ensures the vehicle's stable travel. Through policy support and resource optimisation, the facilities and service capabilities of primary medical institutions are enhanced, enabling effective handling of initial consultations in the most accessible places for the public. This is akin to equipping the vehicle with sturdy and durable wheels, ensuring smooth and reliable travel.

Improving the general practitioner training system is the key to ensuring the vehicle's correct direction and responsive movement. General practitioners, as the executors of primary medical services, directly affect the quality and efficiency of medical services with their professional qualities and capabilities. This is similar to installing an accurate positioning system and agile suspension for the vehicle's wheels, ensuring correct direction and speed under various road conditions.

Establishing a reasonable remuneration system for general practitioners is the source of motivation that keeps the vehicle moving forward. A fair and reasonable incentive mechanism attracts and retains outstanding medical talents, stimulating their enthusiasm and innovative spirit. This is like injecting high-energy fuel into the vehicle's engine, providing continuous power.

Building a trust system for primary care consultations is the social foundation that ensures the vehicle's smooth travel. By enhancing the transparency and reliability of medical services and strengthening health education and medical insurance policy guidance, public trust in primary medical services is gradually established. This is akin to paving a flat and wide road for the vehicle, ensuring smooth travel.

The application of digital and intelligent technologies is the engine that propels the vehicle forward at high speed. The use of technologies such as telemedicine, electronic health records, and intelligent auxiliary diagnostics not only improves the efficiency and quality of medical services, but also optimises resource allocation through data analysis, achieving personalised and precise medical services. This is similar to equipping the vehicle with an advanced electric engine, providing strong and environmentally friendly power.

In summary, the close interlinkage and coordinated development of these five elements cannot only comprehensively enhance the role of "gatekeepers" and "navigators" in primary medical institutions, but also promote the development of medical service models in a more intelligent and efficient direction. Just as an electric car requires the coordinated operation of the engine and wheels, reform of China's primary healthcare system also requires the joint advancement of these five aspects to achieve balanced development and a quality improvement of medical services, thus assuring solid support in the quest to attain the Healthy China strategy goal.

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