

Development Strategy of “New Medicine” Under the Background of Healthy China

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Abstract: This paper starts with the connotation of “new medicine” under the background of Healthy China, focuses on the “new medicine” talent training system, and illustrates the necessity and urgency of developing “new medicine.” Three aspects outline the development of “new medicine” in China: (1) the new strategic requirements for the healthcare system, (2) external demands for transformation and development, and (3) internal demands for medical reform. This paper further elaborates on the basic strategy of “1234” for developing “new medicine,” namely, adhering to the “new concept” of “one center,” establishing the “new quality” of “two types of balance,” promoting the “new system” of “three coordinations,” and strengthening the “new model” of “four kinds of crossing.” Finally, this paper suggests that we should seek active support from government departments, comprehensively promote the overall development of medical personnel, and accelerate innovation in interdisciplinary integration, thus providing useful references for high-level medical personnel training in China.

Keywords: Healthy China; new medicine; interdisciplinary integration

1 Introduction

Health is the foundation of the comprehensive development of people. It is crucial for national security, social stability, and economic development. The strategy of promoting the construction of Healthy China was first proposed in the fifth Plenary Session of the 18th Central Committee of the Chinese Communist Party [1]. In August 2016, General Secretary Xi Jinping also advised that a moderately prosperous society cannot be fully realized without guaranteeing health for all, which should be prioritized as a strategic goal. In October 2016, the Central Committee of the Communist Party of China and the State Council of the PRC issued the “*Healthy China 2030*” *Planning Outline*, defining healthcare as essential for human development, a basis for socio-economic development, an essential token of national wealth and prosperity, and a shared desire of all ethnic groups [2]. The 19th National Congress of the Communist Party of China decided to implement the Healthy China strategy, prioritizing healthcare services as a national strategy. For a long time, medicine evolved from empirical medicine (traditional medicine) and scientific medicine (biological medicine), deeply influenced by the agricultural and industrial revolutions, respectively. Today, under the background of the Healthy China strategy, and especially with the advent of new technologies (such as artificial intelligence), medicine has entered a new era of integrated medicine (new medical) seeking the advancement of new medicine. New medicine, based on humans as a whole, integrates current theoretical knowledge with the most effective clinical experience in medicine and its related disciplines. It is fine-tuned with environmental, social, psychological, and engineering-based factors to promote healthcare services and facilitate diagnosis and treatment [3]. This paper focuses on the training of personnel for the system of new medicine.

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Since 2001, with the strong support of the “Medical College Education Framework and Talent Cultivation Strategy (2016)” research project of the Chinese Academy of Engineering, our team successfully explored and in depth implemented the model of “five + three” to cultivate clinical doctors and inter-disciplinary “public health guardians” with health as its core. Additionally, our team promoted innovation in medical systems and mechanisms and educational reform, serving demand and focusing on quality enhancement. We took the initiative to explore a talent cultivation framework founded on interdisciplinary and innovative new medicine and achieved remarkable progress in nurturing talent and achieving exemplary national teaching results [4]. Based on international experience and the reforms mentioned, and the guidance of the national education conference, national health conference, and national higher education ideological and political work conference, we discussed and proposed policy suggestions on new medicine developmental strategies, in the hope of providing a useful reference for nurturing high-level medical practitioners.

2 Analysis of the demands of developing “new medicine”

Over the past years, high-level medical practitioners have been vital in protecting people’s health, ensuring social stability, and facilitating economic development. However, with the advent of the era of integrated medicine (new medicine), a new system for cultivating medical talent must be established promptly to meet the demands of the Healthy China strategy, representing integrality (serving significant national strategies), combination (stressing interdisciplinary cooperation), and medicine (establishing an extensive framework for medicine).

2.1 Serves the new requirement for implementing the Healthy China strategy

Both the Party and the central government have always prioritized people’s health. Medical education, linking the major projects of education and health, is responsible for nurturing medical talent for the party and the nation and is the solid foundation for the Healthy China strategy. Socialism with Chinese characteristics has heralded a new era, and General Secretary Xi Jinping and other national leaders have introduced new ideas during the national education conference, national health conference, and national higher education ideological and political work conference, which have identify a clear direction for the future development of higher education and healthcare services and proposed the essential principles for medical education reform. Recently, in addition to the “Healthy China 2030” Planning Outline, a series of important documents have been publicized to strengthen medical talent cultivation and new medicine development. The publication of new-era education reform documents by the General Office of the Central Committee of the CPC and the General Office of the State Council in August 2018 has officially initiated the development of new engineering, new medicine, new agriculture, and new arts. Therefore, the development of new medicine is the latest requirement for medical education in the new era, which can directly fulfill the demands of medical practitioner team-building for the Healthy China strategy.

2.2 Satisfies the new external demand for national transformational development

Since the founding of the People’s Republic of China, especially after the reform and opening-up 40 years ago, China has been significantly enhanced with tremendous social progress and the dramatic improvement of people’s lives. The advent of the 4th technological revolution altered the forms, work distribution, and organization of some industries, and transformed the way people live, work, and think. Advancements in AI, big data, and life science, as well as the rapid development in high-resolution imaging diagnosis and new biomaterials will bring innovation in medicine. Innovation has been the pillar of medical education in the new era, which plays a vital role in cultivating high-end talent. In October 2015, the State Council published the *Outline of the Establishment of World-Class Universities and Disciplines*, prioritizing the “World-Class Universities and Disciplines” (or Double World-Class) Project by focusing on cultivating versatile individuals with a heightened sense of historical mission, social responsibility, innovation, and application [5]. Therefore, new medicine development must follow the times by emphasizing interdisciplinary exchanges and ultimately satisfying the new demands of socio-economic development, particularly focusing on the technological development of medicine.

2.3 Satisfies the new internal demand for medical disciplinary reform

Profound changes have occurred in the disease spectrum, ecological system, and lifestyle, and the medical model has transformed into an environment–society–psychology–engineering–biology model. China is facing threats from multiple diseases and complicated health factors. The core of medical education has shifted from

treating diseases to providing healthcare services. Medicine is not equal to clinical medicine, and clinical doctors cannot singlehandedly address all challenges regarding the prevention and control of major diseases and disciplinary problems. The clinical team must work in tandem with colleagues in basic science, clinical medicine, public health, pharmacy, and nursing. The demand for the reform of traditional medicine requires collaboration between clinical medicine and other medical officers.

In July 2017, the General Office of the State Council published the *Guidance on Strengthening Coordination of Medicine and Education to Further Promote Educational Reform and Development*, which not only emphasizes the model of “five + three” to cultivate clinical doctors but also defines the coordinated development of professionals in public health, pharmacy, nursing, rehabilitation, and medical technologies as a major goal in medical education reform [6]. Therefore, the development of new medicine requires a shift from stressing clinical practice, while neglecting basic science and prevention, to the establishment of a broader understanding of medicine.

3 Basic strategies for developing “new medicine”

3.1 Adhere to the new concept of “one priority”

Aligning with the Healthy China strategy, adhering to the concept of putting people first, incorporating the concept of extensive health into each aspect (enrollment, cultivation, employment) and stage (college education, postgraduate education, continuing education) of medical education can facilitate the development of new medicine. To ensure that education focuses not only on treatment but also on prevention and nursing, healthcare must serve every stage of life and provide resources and support for practitioners to ensure that Chinese healthcare aligns with all policies and accelerates the transformation of healthcare methods.

3.2 Set up the new quality of “two types of balance”

Developing new medicine requires focusing on a new quality of education and establishing a balance between internal and external medical education. On the one hand, government departments should establish and improve mechanisms for cultivating medical talent to ensure a balance between supply and demand and, as such, coordinate the needs of medical professionals in various medical institutes. Administrators in the education and health departments should explore to establish the joint mechanism of enrollment, talent-cultivation, and employment, and improve the enrollment of medical colleges based on type of education and quality of cultivation. On the other hand, medical colleges should establish an internal balance between teachers and students and learn domestic and overseas experience. Based on the type of school and teacher-student ratio, every college should choose the appropriate teaching methods, promote teaching reform, and focus on the progress quality of cultivating medical talent.

3.3 Promote the new system of “three synergies”

To develop the new medicine, it is necessary to promote the development of a new system synergizing medicine and education, science and education, and science and health. A collaborative health service system for medical education and research should be finally established. First, the synergy between medicine and education can be strengthened by using demand as the guide, basic education as the focus, and quality as the core to perfect the medical personnel training mechanism and incentive mechanism to rapidly develop a large pool of qualified medical practitioners. Second, coordination between science and education, comprehensive education reform, and the construction of double first-class universities are recommended to achieve a paradigm shift in education and training methods to integrate teaching and research and the cultivation of the scientific spirit and innovative talent. Third, the creation of a coordinated science and health system is recommended to help focus efforts on planning and construction of national clinical medical research centers; promote clinical transformation research; innovate collaboration among hospitals, research centers, and enterprises; cultivate technological innovation talents; implement achievement transformation; and promote appropriate technology.

3.4 Strengthen the new model of “four integrations”

To develop new medicine, it is necessary to strengthen the new model of “four integrations,” namely, the integration of the internal disciplines of medical sciences, medicine and humanities, medicine and engineering, and traditional medicine and emerging medicine, focusing on interdisciplinary and integrated innovation. First, the cross-disciplinary integration of basic medicine, clinical medicine, preventive medicine, nursing care, and

pharmaceutical practice strengthens medicine’s integration. Second, the strengthening of the integration of medicine and the humanities, with adherence to the original aspiration of cultivating talents, is recommended. This will promote the synergy of humanities education and professional education, which is conducive to the integration of ideological and political education and medical ethics throughout the entire process of education and will ultimately lead to the cultivation of compassionate, skilled practitioners. Third, solidifying the coordination between medicine, science, and engineering is advised. Improving cross-discipline mechanisms, exploring the integration of medicine and science and medicine and engineering, along with establishing cross-discipline research institutions at a higher level will help facilitate the construction of double first-class universities [7]. Fourth, strengthening the integration between traditional medicine and emerging medicine is recommended. Adapting to the global industrial revolution 4.0 and the life science revolution 3.0 is suggested, as is establishing new medical disciplines such as intelligent medical engineering based on Chinese economic and social development as well as scientific and technological changes. Moreover, the advantages of traditional medicine should also be integrated to serve national needs better and play a leading role in worldwide medical education reform and development.

4 Policy suggestion for developing “new medicine”

4.1 Strive for government support

The construction and development of medical colleges and medical disciplines have unique needs and require sufficient investment and policy support. New medicine involves different departments, disciplines, and applications of new technology; therefore, the development of new medicine is inseparable from strong government support. It is recommended that the Ministry of Education, National Health Commission, and relevant government departments strengthen policy coordination by providing preferential support to the construction of new medicine in personnel training, scientific research, base construction, and funding investment to accelerate new medicine in China and offer better services for the development of national and local medical education and health development. We will select pilot units for the construction of new medicine and support the above-mentioned units in terms of construction of world-class universities and disciplines and projects for national reforms and construction.

4.2 Comprehensively promote the training of medical personnel

For medical schools of comprehensive universities and medical colleges, we recommend focusing on basic medicine, clinical medicine, public health, and clinical pharmacy with discipline construction as the core for exploring and innovating the reform of the integrated cultivating model from the aspects of objective, mode, curriculum system, faculty, management mechanism, international exchange and cooperation, enrollment, employment, and so on. First, promoting the future scientist cultivation plan for basic disciplines relies on first-class teachers, resources, significant research projects, and key laboratories to establish international training programs and scientific research competence training projects to facilitate the combination of bachelor and master degree programs in basic medicine. Second, innovative doctoral cultivation courses with eight-year programs in clinical medicine as a pilot project could use the arts and humanities of comprehensive universities, outstanding faculty in basic medicine, and the abundant clinical teaching resources of affiliated hospitals to ultimately cultivate talented practitioners with a sound scientific foundation, solid professional skills, strong innovation capabilities, great potential, and superior quality. Third, it is necessary to establish “four + two” bachelor plus master degree programs (multilingual), improve international courses and international exchange mechanisms, expand internship programs in overseas organizations, establish a second foreign language assessment system, synergize various disciplines, and implement “four + two” bachelor plus master degree programs to train and select talented individuals to earn jobs in international organizations. Fourth, a high-level talent cultivation program for clinical pharmacy would enhance the curriculum system and teaching materials for high-level pharmaceutical professionals, further standardizing the development of high-level talent in clinical pharmacy in China, and ultimately achieving the goal of establishing the professional degree of Pharm.D in China.

4.3 Accelerate interdisciplinary synergy and innovation

We suggest that medical schools of comprehensive universities and medical colleges should give full attention to the multidisciplinary advantages of comprehensive universities and should develop large health discipline

systems with medicine, integrating it with engineering, science, and the arts. Moreover, it is necessary to establish several “Med-X” medical cross-discipline research institutions that are internally consistent, innovate institutional mechanisms, and explore the “Med-X” cross-discipline cultivating model. In particular, universities and disciplines included in the double world-class projects should actively engage in the construction of the “Med-X” interdisciplinary research institutions, select and establish several interdisciplinary talent programs, initiate enrollment and cross-disciplinary personnel cultivating programs, and provide financial support for Ph.D. students’ innovative research. Courses should be designed for interdisciplinary education and the institutional mechanisms for cross-disciplinary personnel development. Additionally, we should establish rules and regulations for facilitating interdisciplinary talent for admission criteria, training plans, degree-awarding standards, and quality assurance mechanisms. The above-mentioned cross-discipline integration refers to: the cooperation and integration of the relevant knowledge systems; the mutual promotion and cooperation of value systems; and mutual transformation and integration of innovation systems.

In conclusion, in the context of Healthy China, the development of new medicine is a major opportunity and challenge for the reform of medical education in China. It is necessary to seize this opportunity, strengthen top-level design, support the development of new medicine by means of policy, capital, and project, promote the interdisciplinary synergy between medicine and the arts, science, and engineering to cultivate numerous outstanding medical practitioners to contribute to the growing needs of people for better living.

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