

The Formation and Development of Macau's Healthcare System

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Abstract: Macau has played a pivotal role in the eastward spread of Western medicine and its health governance experience, particularly in the construction of its healthcare system, has led and represented the modern transformation of urban health governance in early China to some extent. This study, from an urban history perspective, analyzes the process and experience of constructing Macau's healthcare system. It summarizes the current developmental status of Macau's healthcare system, examines its main features and construction effectiveness, and suggests strategies for improvement. These include increasing the allocation of specialized medical resources, enhancing the cultivation of talents in the broader health sector, and promoting collaborative healthcare and disease prevention in the Guangdong-Hong Kong-Macau Greater Bay Area. Finally, the study highlights the insights gained from Macau's public-private partnership model and the comprehensive coverage of its primary healthcare services, offering new ideas for health governance in the Greater Bay Area and beyond.

1. Introduction

Macau, being one of the earliest ports open to foreign trade, was the first and for a long time directly influenced by the eastward spread of Western knowledge, marking it as the birthplace of Western medicine's introduction to the East^[1-3]. In 1569, the Catholic Church established the first Western-style hospital in China in Macau, named Hospital of St. Raphael, which also served as the starting point for the introduction of cowpox vaccination into the country^[4]. After centuries of development, Macau has become one of the few regions recognized by the World Health Organization (WHO) as having a healthy population. The experience of health governance in Macau, especially in the construction of its healthcare system, represents and leads the modern transformation of early urban health governance in China^[5]. In the context of the "Healthy China" initiative, analyzing the process and experience of constructing Macau's healthcare system from an urban historical perspective, summarizing its current state, and examining its main features and construction effectiveness, is undoubtedly of significant instructive importance for health governance in the Guangdong-Hong Kong-Macau Greater Bay Area^[6,7] and nationwide.

2. Historical Context of the Formation of the Healthcare System in Macau

The introduction of Western education to the East began with medicine, which easily garnered public sympathy due to its role in healing and saving lives^[8]. Thus, the dissemination of medical knowledge became the vanguard

among various disciplines. From the 16th century, Western missionaries and merchants, driven by political and economic motives, embarked on expeditions to the East. Many arrived in Macau, traveling through the Pearl River to Guangzhou and then overland via the ancient Meiling Trail to the interior of China, spreading Western culture^[9,10]. Western medical culture, in particular, was an important aspect adopted by these missionaries in China. The history of medical development in Macau is closely linked with China's history of suffering under imperialist oppression. Therefore, the formation and development of Macau's healthcare system can be divided into four stages.

2.1. Establishment of the First Western Hospital to the Pre-Opium War Era (1569-1840)

During this period, Western medicine gradually made its way into Macau, evolving from non-existent to prevalent, though traditional Chinese medicine remained dominant. However, achievements and writings in Chinese medicine in Macau were scarce at this time. In 1569, the first Western hospital in China, St. Raphael's Hospital (also known as "White Horse Medical Hospital" or "Hospital for Healing People"), was established in Macau by the Catholic Church's first bishop there, D. Melchior Carneiro. In 1594, a medical facility with sixty beds was set up in the St. Paulo Monastery, managed by monks with basic surgical and pharmaceutical knowledge. In 1820, Dr. Robert Morrison and Dr. Benjamin Hobson opened a clinic in Macau, employing Chinese doctors to treat the poor^[11]. In 1828, Dr. William Lockhart of the East India Company established an ophthalmic hospital in Macau. During this period, Western missionaries established several hospitals in Macau, laying the foundation for the

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healthcare system there.

2.2. The Opium War to the Portuguese Revolution Period (1840-1974)

During this era, under Portuguese administration, Western medicine in Macau was widely disseminated and gradually became the dominant medical practice, relegating traditional Chinese medicine to a secondary role. In 1871, Shen Wang, Cao You, and others registered and established the Kiang Wu Hospital, initially providing only traditional Chinese medicine services. It began offering Western medical services in 1892 when a young Dr. Sun Yat-sen, a graduate of the Hong Kong College of Medicine for Chinese, started practicing there, becoming the hospital's first Western-trained Chinese doctor and Macau's first Chinese practitioner of Western medicine^[12]. In 1874, the Earl of Manila General Hospital was opened, originally a military hospital, providing services only to military personnel, but later the service targets were gradually expanded to include government officials and other Portuguese nationals, and most of the doctors stationed in the hospital at that time came from Portugal, making it a public hospital in Macau^[13]. In 1892, 269 Hong Kong and Macau businessmen and merchants with a passion for charity founded the Macau Tong Sin Tong, whose main daily services include: helping the poor, giving medical care and medicines, free education, free childcare, respecting the elderly and providing emergency relief, etc., as well as the establishment of a Traditional Chinese Medicine Bureau^[14]. In 1951, the Federation of Trade Unions of Macao set up the Workers' Medical Clinic to provide low-cost healthcare services to the working class. In 1951, the Federation of Trade Unions of Macao established the Workers' Medical Clinic to provide low-fee healthcare services to the working class^[15]. During this period, Macao's healthcare service system was initially formed, with public-private partnership in the provision of healthcare services and no systematic intervention by the government.

2.3. Post-Portuguese Revolution to the Handover of Macau (1974-1999)

This period marked a transitional phase for Macau, with the Macau government regaining autonomy in administration, economy, finance, and legislation, leading to significant economic progress and changes. The structure of public health services largely mirrored the Portuguese model. The Health Bureau of Macau, an autonomous public service entity, was led by a director and comprised various units for hospital administration, hierarchy, technical and budgetary decision-making. In 1984, the Government of Macao proposed in its policy guidelines the establishment of a health care system covering the whole population, rooted in a centuries-old and very modern hospital, the Earl G. Yen General Hospital, complemented by health centers, which provide free health care services to Macao's residents. The system is rooted in a century-old and very modern hospital, the Earl Grey General Hospital, which is complemented by

health centers providing free medical services to Macao residents. Subsequently, Decree-Law 24/86/M of 1986 and Decree-Law 68/89/M of 1989 were passed to formalize the healthcare protection scheme, which was financed by tax revenue and provided directly by the public sector. After the establishment of Chopstick Kei Health Center, the first health center in Macao, from 1985 to 1992, the Toi San Health Center, Tap Seac Health Center, Taipa Health Center, Coloane Health Center, Sa Lei Tau Health Center, Hoi Fong Health Center, Fung Shun Tong Health Center, and Hac Sa Wan Health Center were opened one after the other, marking the beginning of a public health care system consisting of 7 health centers. The opening of Taipa Health Center, Coloane Health Center, Sha Lei Tau Health Center, Hoi Pong Health Center, Fung Shun Tong Health Center and Hac Sa Wan Health Center marks the completion of the public primary health care (PHC) service network consisting of seven health centers and two health stations. The opening of the Hac Sa Wan Health Center marked the completion of the public primary health care (PHC) service network consisting of seven health centers and two health stations. In this era, Macau's hybrid healthcare system was firmly established, with public and private hospitals providing medical services and a multi-center PHC system offering preventive and basic medical care.

2.4. After the return of Macao (after December 20, 1999)

After the handover of Macao, the healthcare service system underwent a series of developments and reforms in order to adapt to the economic, social and demographic changes in the MSAR. 1999 saw the establishment of the MSAR, and the Macao Health Division was renamed as the Health Bureau^[13]. In 1999, with the establishment of the Macao SAR, the Department of Health was renamed the Health Bureau. In the 21st century, the Health Bureau has responded to the challenges of infectious diseases, consolidated and strengthened the preventive and control measures of public health, advocated the health concept of "prevention first, proper medical treatment", and continued to optimize and improve the medical and healthcare services and facilities in order to safeguard the health of the population. In terms of public specialized healthcare services, the Taipa Psychiatric Building was opened in 2005; the Hemodialysis Unit, Peritoneal Dialysis Unit and Day Hospital were expanded in 2009 and 2010; the Outlying Islands Emergency Departments of the Earl Grey General Hospital were set up in 2011; the Taipa Community Complex was set up in 2012; the new Emergency Department Building of the Earl Grey General Hospital was opened in 2013; the Coloane Clinical Center for Public Health was completed in 2016; and the Kau Yuk Clinical Center was opened in 2019. Center was inaugurated in 2016; the Kau O Rehabilitation Hospital was opened in 2019; in October 2023, Law no. 15/2023 "The Islands Healthcare Complex-Macao Medical Center of Peking Union Medical College Hospital"^[16] College of the Outlying Islands came into force, and the Macao Medical Center of the Peking Union Medical College of

the Outlying Islands Peking Union Medical College (PUMC) is a public medical institution designated by the Chief Executive's Order published in the Official Bulletin of the Macao Special Administrative Region (MSAR), and is operated and managed by PUMC. PUMC, through the export of its brand name, human resources, management, and medical technology, jointly operates the Medical Center with the MSAR Government, in particular, it sends its management team to participate in the composition of the Strategic Development Committee and the management team. In terms of private specialized healthcare services, in 2003, the establishment of HKUST Hospital, supported by the Macau University of Science and Technology, was approved^[17]. In 2009, the Dr. Henry Fok Specialist Medical Building of Kiang Wu Hospital was inaugurated^[12]. In 2014, Macao Hospital Yin Kwai was established^[18]. In terms of primary health care services, in 2006, Dr. Fok Ying Tung's Specialized Medical Building was opened at Kiang Wu Hospital. In terms of primary healthcare services, the new Hac Sa Wan Health Center was put into operation in 2006; the Taipa Elderly Healthcare Station was relocated and expanded in 2012; the Coloane Shek Pai Wan Temporary Healthcare Station was established in 2013; the Lakeside Carmel Healthcare Center was put into operation in 2015; the Coloane Healthcare Station's expansion was completed in 2016; the Green Island Healthcare Center was put into operation in 2018; and the Shek Pai Wan Healthcare Center will be inaugurated in 2022; Opening of healthcare clinics for the elderly, healthcare areas for the elderly, drug counseling services, health education, medical social worker support, and addition of Chinese acupuncture, smoking cessation counseling clinic and mental healthcare clinic in some of the healthcare centers, etc., to continue to improve the medical and healthcare services in the community.

3. Current Development of the Healthcare System in Macau

Presently, the Macau Special Administrative Region (SAR) Government is actively promoting public-private

partnerships in specialized medical services and cross-regional collaboration. The focus of health center services is shifting from treating diseases to preventing them and promoting health. Moreover, the role of civil associations in multi-centered governance is being fully utilized, resulting in the formation of a hybrid healthcare system

3.1. Administrative Management

The primary administrative body for healthcare in Macau is the Health Bureau, which possesses administrative, financial, and property autonomy. It operates under the supervision of the Macau SAR Government's Secretary for Social and Cultural Affairs. The Health Bureau is responsible for providing specialized and community health services, disease prevention and health promotion, medical care and rehabilitation services, training healthcare professionals, and assisting and overseeing private medical institutions to ensure public health. In terms of administrative management, it is divided into specialized healthcare, general healthcare, and administrative and technical support categories, and includes departments such as Research and Planning, Medical Specialty College, and the Disease Prevention and Control Center. Within the specialized healthcare category, the Conde de São Januário Central Hospital is directly managed by the Health Bureau, comprising departments like Medical Affairs Officer, Chief Nursing Officer, Hospital Administration, Social Work, and Public Relations. In the general healthcare category, departments include Community Medical and Health Services, Traditional Chinese Medicine Services Development, Nursing Supervision, Medical Activities Photography, Blood Donation Center, Public Health Laboratory, and Tobacco and Alcohol Control Office. The administrative and technical support category includes Human Resources, Financial Management, Information Technology, and Facilities Equipment departments. The organizational structure of the Macau Health Bureau is illustrated in Figure 1.

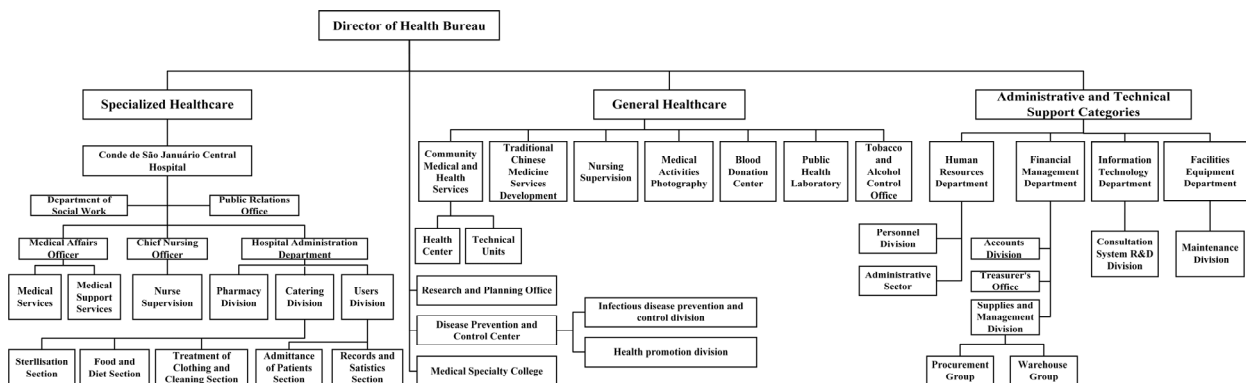


Figure 1 Organizational Structure of the Macau Health Bureau

3.2. Medical Insurance and Coverage

The healthcare system in Macau offers broad medical coverage. In terms of public medical insurance, health

centers provide free basic medical services to all residents of Macau, who can visit their local health center with their identity card to enjoy free primary healthcare. The Conde de São Januário Central Hospital is open to all residents of

Macau and offers direct reductions in government-subsidized fees, charging per visit. Free services are provided to specific groups, including pregnant and postpartum women, the elderly, children, students, teachers, public servants or their family members, the impoverished, and patients with certain diseases. To meet the rapidly growing demand for medical services, the government collaborates with several non-profit private medical institutions, subsidizing specialized medical services (such as inpatient, emergency, and cardiac surgery), general medical and dental outpatient services, rehabilitation, home nursing, cervical cancer screening, psychological therapy, patient escort services, dental sealant, and periodontal treatment. The government promotes public-private collaboration in the healthcare system by annually distributing medical vouchers for residents to purchase health check-ups and basic medical services.

Regarding private medical insurance, it is typically provided by employers, jointly funded by employers and residents, or purchased by residents through commercial health insurance plans. Currently, there are 24 insurance companies in Macau offering various commercial insurance plans.

According to the "Macau Medical Insurance System Research Report" published by the Health Bureau of the Macau SAR Government in 2019, among 2000 respondents, 475 (23.75%) enjoyed free government specialist medical services^[13]. The highest proportion was among those aged 65 and above (57.47%), followed by public servants or their family members (26.74%), holders of the Health Bureau's yellow healthcare card (5.47%), teachers or staff holding cards issued by the Youth and Education Bureau or retired teaching staff with healthcare cards (5.26%), holders of the blue healthcare card or doctor's certification from the Health Bureau (2.74%), and beneficiaries of the Social Welfare Bureau's aid card and registered disability assessment certificate holders (each 0.63%); other reasons accounted for 1.05%. Among the 2000 respondents, the highest proportion, 777 people (38.85%), did not participate in either personal or company medical insurance; followed by those only participating in company medical insurance (33.55%); those participating in both personal and company medical insurance (14.90%); and the lowest proportion, only participating in personal medical insurance (12.70%). The average annual premium for those participating in both personal and company medical insurance was MOP 8699, while for those only participating in personal medical insurance, it was MOP 8724.

3.3. Service provision

3.3.1. Specialized Medical and Health Services

Macau operates a hybrid healthcare system where specialized medical and health services are provided by both public and private medical institutions. The public hospitals include the Conde de São Januário Central Hospital, the Ilha Verde Rehabilitation Hospital, and the Beijing Peking Union Medical College Hospital Macau Medical Center on the Outlying Islands. Among these, the Conde de São Januário Central Hospital, with the longest history, has undergone two reconstructions and consists of four buildings: the Surgery Building, the Obstetrics and Pediatrics Building, the Outpatient Building, and the Emergency Building, covering a total area of approximately 72,000 square meters and offering 1,036 beds. The Ilha Verde Rehabilitation Hospital, mainly focused on rehabilitation services, has four floors divided into physical therapy areas and rehabilitation wards, with a total area of 11,000 square meters and 188 beds. The Outlying Islands Medical Complex, the largest in scale, includes the Macau Hospital, auxiliary facilities building, staff dormitory building, comprehensive service administration building, and central laboratory building, covering a total area of about 430,000 square meters. It is planned to have 800 beds and is scheduled for a trial opening on December 20, 2023, and official operation on the anniversary of Peking Union Medical College Hospital on September 16, 2024. The non-profit private hospitals include Kiang Wu Hospital and the University of Macau Hospital. Kiang Wu Hospital, with five buildings and a Taipa Medical Center, has 736 beds and includes 19 clinical and medical technology departments and 21 medical centers. The University of Macau Hospital serves as a clinical teaching base for the University of Macau's Faculty of Medicine, Faculty of Traditional Chinese Medicine, and Faculty of Pharmacy and currently has 108 beds.

According to medical statistics data released by the Statistics and Census Service of the Macau SAR Government^[19], in 2022, there were four hospitals in Macau, the same as the previous year; 1,721 inpatient beds were available, a decrease of 1.3% from the previous year, with 2.6 beds per thousand population; there were 1,965 doctors, an increase of 4.1% from the previous year, with 2.9 doctors per thousand population; 2,863 nurses, an increase of 4.4%, with 4.3 nurses per thousand population; 306 dentists, a decrease of 0.3%; and 724 traditional Chinese medicine practitioners, an increase of 2.1%. The number of inpatients was 60,609, an increase of 3.8%; the bed occupancy rate was 69.6%, a decrease of 1.1%; there were 373,080 emergency department visits, a decrease of 4.2%; 1,931,195 outpatient visits, a decrease of 1.6%; and 18,308 surgical patients, a decrease of 4.5%. The situation of specialized medical and health services in Macau over the past five years is shown in Table 1.

Table 1 Specialized Medical and Health Services in Macau from 2018 to 2022

	2018	2019	2020	2021	2022
Hospitals (No.)	5.0	5.0	4.0	4.0	4.0
Inpatient Beds (No.)	1604.0	1628.0	1715.0	1744.0	1721.0

Inpatient Beds per 1000 population	2.4	2.4	2.5	2.6	2.6
Inpatients (No.)	60131.0	62472.0	54337.0	58390.0	60609.0
Occupancy Rate of Inpatient Beds (%)	74.4	78.3	66.2	70.7	69.6
Emergency Services Recipients (No.)	464995.0	489384.0	342363.0	389627.0	373080.0
Outpatient Consultations (No.)	1788267.0	1891678.0	1741618.0	1962168.0	1931195.0
Surgical Operations (No.)	18377.0	19537.0	18214.0	19169.0	18308.0
Primary Health Care Establishments (No.)	3935173.0	4112188.0	3249007.0	3415087.0	3134849.0
Doctors (No.)	1754.0	1808.0	1789.0	1888.0	1965.0
Doctors per 1000 population	2.6	2.7	2.6	2.8	2.9
Dentists/Odontologists (No.)	266.0	277.0	283.0	307.0	306.0
Dentists/Odontologists per 1000 population	0.4	0.4	0.4	0.4	0.5
Doctors of Chinese Medicine/Chinese Herbalists (No.)	696.0	690.0	700.0	709.0	724.0
Doctors of Chinese Medicine/Chinese Herbalists per 1000 population	1.0	1.0	1.0	1.0	1.1
Nurses (No.)	2464.0	2491.0	2568.0	2742.0	2863.0
Nurses per 1000 population	3.7	3.7	3.8	4.0	4.3

3.3.2. Primary Healthcare Services

To achieve the World Health Organization's goal of "healthcare for all" and to improve the health status and medical welfare of residents in Macau, the Macau government has emphasized the development of primary healthcare services. These services include child healthcare, adult healthcare, prenatal care, women's health, school health, oral health, traditional Chinese medicine, vaccination, mental health, physical examinations, health counseling, health education, infectious disease prevention, and management of chronic non-communicable diseases. Health centers have been established across Macau, with the government currently operating nine health centers and two health stations, providing free primary medical and health care services to the residents. These facilities are widely distributed across

the Macau Peninsula (six health centers) and the two outlying islands (three health centers and two health stations), ensuring coverage for all local residents. This ensures that all residents have access to free or affordable primary healthcare near their homes.

According to the statistical yearbook data released by the Health Bureau of the Macau SAR Government^[13], in 2022, there were 751,711 outpatient visits to health centers, a decrease of 12.7% from the previous year. The top three categories of these outpatient visits were adult healthcare, non-appointment clinics, and traditional Chinese medicine. Nursing services provided by health centers totaled 2,232,004, a decrease of 19.7% from the previous year. There were 21,337 group health education activities, a decrease of 13%, and the number of participants in these activities was 458,091, a decrease of 11.3%. The medical activities at Macau's health centers over the past five years are presented in Table 2.

Table 2 Medical Activities at Health Centers in Macau from 2018 to 2022

	2018	2019	2020	2021	2022
Consultations at Public Health Centres(No.)	859659	918923	804099	860723	751711
Child Health Care (No.)	81291	77727	68178	66864	54291
Adult Health Care(No.)	314146	330843	335314	351560	329327
Prenatal Care(No.)	37149	37363	32532	29676	21165
Women's Health Care(No.)	49759	51320	46725	52465	43156
School Health Care(No.)	5119	6606	2185	9334	6354
Oral Care(No.)	24698	26176	18557	21457	14939
Fissure Sealant(No.)	5817	6508	2114	6820	5387
Chinese Medicine(No.)	66340	74978	70329	78441	63044
Medical Check-up(No.)	19958	20446	18504	18895	16542
Counseling on smoking cessation(No.)	2333	2488	1412	1627	1317
Mental Health Care(No.)	3625	4061	4796	6513	4961
Counseling on nutrition(No.)	-	-	-	99	4283
Consultation without appointment(No.)	249424	280407	203453	216972	186945
Medical Check-up for Civil Servants(No.)	16640	17075	12652	12654	7193
Nursing activities	3011881	3092672	2531856	2780667	2232004
Group health education activities	34764	37924	25998	24514	21337
Group Health Education Participants(No.)	836768	826444	493232	516596	458091

3.4. Population health outcomes

The robust primary healthcare services in Macau play a foundational role in the healthcare system, contributing to health outcomes that rank among the world's best since Macau's handover. According to statistics from the Health Bureau of the Macau SAR Government, in 2019, the average life expectancy in Macau was 83.8 years, which is 10 years higher than the global average and 6.1 years higher than that of the Western Pacific region. In 2022, the

average life expectancy remained at 83.8 years, with males at 80.9 years and females at 86.7 years. The mortality rate in 2022 was 4.4‰. In 2021, the infant mortality rate was 1.8‰, which is 26.6‰ lower than the global average and 7.2‰ lower than the Western Pacific region; in 2022, the infant mortality rate was 0.9‰. The neonatal mortality rate in 2021 was 1.4‰, 16.2‰ lower than the global average and 4.2‰ lower than the Western Pacific region; in 2022, the neonatal mortality rate was 0.9‰. The health outcomes of the Macau population over the past five years are presented in Table 3.

Table 3 Health Outcomes in the Population of Macau from 2018 to 2022

			2018	2019	2020	2021	2022
Life expectancy	Macau	Total	83.7	83.8	84.1	84.2	83.8
		M	80.6	80.8	81.1	81.3	80.9
		F	86.6	86.7	86.9	87.1	86.7
	Global	Total	-	73.3	-	-	-
		M	-	70.8	-	-	-
		F	-	75.9	-	-	-
Western Pacific	Total	-	77.7	-	-	-	
	M	-	74.8	-	-	-	
	F	-	80.8	-	-	-	
Mortality rate(‰)	Macau		3.1	3.4	3.3	3.4	4.4
	Macau		3.4	1.5	2.2	1.8	0.9
Infant mortality rate(‰)	Global		29.7	29.2	28.9	28.4	-
	Western Pacific		9.5	9.2	9.2	9	-
	Macau		2.5	1.2	1.4	1.4	0.9
Natal mortality rate(‰)	Global		18.4	18.1	17.9	17.6	-
	Western Pacific		5.9	5.7	5.7	5.6	-

equipment, personnel, and beds to effectively meet the healthcare needs of its residents.

4. Discussion and Recommendations

4.1. Increasing Specialized Medical Resources in Macau

Macau's specialized medical services feature advanced medical facilities and technology, high levels of medical expertise, and professional doctors and nurses, providing patients with high-quality medical care and access to the latest treatment methods and technologies. However, these services often come with high medical costs and long waiting times, particularly for popular specialties. Additionally, language and cultural differences can sometimes pose communication challenges with some doctors or hospitals. In 2022, Macau had 2.6 hospital beds per thousand population compared to 6.9 in Mainland China; 2.9 doctors per thousand population compared to 3.5 in Mainland China; 4.3 nurses per thousand population compared to 3.7 in Mainland China. These figures indicate that Macau's bed and physician resources are lower than those in Mainland China. Therefore, Macau should further increase its allocation of specialized medical resources and strategically plan the distribution of hospital

4.2. Strengthening the Development and Training of Health Professionals in Macau

Currently, Macau is at a critical juncture, transitioning and upgrading traditional industries while nurturing emerging industries. Consolidating and enhancing dominant industries, focusing on developing new industries, and optimizing the economic structure to promote moderate diversification of Macau's economy are top priorities for the Macau SAR Government. In this context, strengthening the development and training of health professionals is crucial. Macau should establish a comprehensive system for nurturing health talent to support the sustainable development of the health industry. First, targeted policies for talent acquisition and training should be implemented, including simplifying visa procedures for professionals and offering tax incentives to attract more health experts to develop their careers in Macau. Second, specialized training institutions should be established to provide professional courses in health-related fields, including medicine, nursing, and health management, to cultivate multi-level and multi-

disciplinary health professionals. Third, collaboration between industry, academia, and research institutions should be enhanced to establish a platform for cooperation in education and research, fostering knowledge and technology exchange, and promoting innovation and development in the health sector. Lastly, strengthening international collaboration in the health field is vital. Attracting world-class medical and health management experts to Macau for lectures and training will elevate the international competency of local talent.

4.3. Advancing Medical and Preventive Collaboration in the Guangdong-Hong Kong-Macau Greater Bay Area

Since the release of the "Outline Development Plan for the Guangdong-Hong Kong-Macau Greater Bay Area" in 2019, exchanges among Guangdong, Hong Kong, and Macau have increasingly intensified, leading to significant achievements in economic and cultural development. Collaborative development in medical and public health services within the Greater Bay Area is a crucial aspect of the region's construction. It serves as a practical pathway for deepening cooperation between Mainland China, Hong Kong, and Macau, aids in integrating residents of Hong Kong and Macau into the national development framework, and is key to safeguarding the health and wellbeing of residents in these areas. The demand for medical collaboration in the Greater Bay Area is becoming more pronounced. The signing of agreements such as the CEPA, the "Guangdong-Hong Kong Cooperation Framework Agreement," and the "Guangdong-Hong Kong-Macau Greater Bay Area Health and Health Cooperation Framework Agreement" has laid a solid foundation for collaborative medical and preventive development in Guangdong, Hong Kong, and Macau. However, it's important to acknowledge that this collaboration still faces challenges in terms of systems and mechanisms. Policymakers need to reflect on how to ensure that healthcare reforms transcend being merely "hospital reforms" or "pharmaceutical reforms" and truly become a comprehensive "public health reform" aimed at protecting people's health and safety. In the face of serious situations and challenges, Macau should actively promote medical and preventive collaboration within the Greater Bay Area, exploring more open, comprehensive, and systematic innovative paths for collaborative development, aiming to achieve a complementary healthcare system among Guangdong, Hong Kong, and Macau.

5. Revelation

After years of development, Macau's healthcare system has evolved into a mixed system primarily comprising public healthcare, supplemented by private healthcare, and underpinned by Primary Health Care (PHC), offering broad coverage of medical and health services. Residents enjoy free primary healthcare, achieving the goal of universal coverage. In specialized medical care, free services are provided to certain groups. For cases requiring treatments unavailable in Macau, the current

medical system offers referral services. Despite facing significant challenges within the context of integration into the Greater Bay Area and the Macau SAR Government's push towards a major health industry, Macau's healthcare system, especially in its public-private partnership model and full coverage of primary healthcare services, still holds important implications for health governance in the Greater Bay Area and even nationally.

5.1. Implications of the Public-Private Partnership Model

Macau's experience with its healthcare system demonstrates that market mechanisms and government functions can effectively combine and synergize in the medical and health service sector, addressing issues of insufficient public medical resources and uneven distribution. Implementing a public-private partnership model in healthcare governance can address issues of universal health equality. Three key areas should be focused on in implementing this model:

First, the social responsibility and mission of private medical institutions. Kiang Wu Hospital in Macau, a non-profit private medical institution, has continuously developed over a hundred years, adhering to a service ethos centered on thriftiness, compassion, respect, and patient-centric care, providing high-quality medical services. Private hospitals should not only address medical and health needs but also establish trust and a positive image in society. This integrity fosters internal cultural and regulatory development, external legal operations, and standardized services, firmly eliminating non-compliant practices in the industry.

Second, formulating supportive policies for private medical institutions. Since 2009, Macau has initiated the "Medical Voucher Scheme," aimed at subsidizing residents' medical expenses and assisting the operations of private medical institutions, sharing the load of public hospitals, and promoting the diversification of medical services. Encouraging private investment in healthcare, the government should provide subsidies, credit support, and other means to expand financing channels. In funding, health insurance policies, and fiscal taxation, different policies should be implemented to provide a favorable external environment for private hospitals.

Third, strengthening the approval and regulation of private medical institutions. Further refining strict entry and exit mechanisms for private medical institutions, changing the "entry without management" or "entry without exit" approach, ensuring the effectiveness of law enforcement, optimizing the quality of medical services in the jurisdiction, and reassuring the public about the safety of medical services. Establishing a clear, collaborative, and effective comprehensive regulatory system and a diversified comprehensive regulatory system combining institutional autonomy, industry self-regulation, government supervision, and social oversight are vital to standardize medical services and protect public health rights and interests.

5.2. Implications of Universal Primary Healthcare Coverage

Upholding the Macau SAR Government's policy of "proper medical care with a focus on prevention," the Macau Health Bureau has continuously expanded and optimized primary healthcare services, achieving universal coverage and excellent population health outcomes. Primary healthcare is a societal approach to health, ensuring the highest possible level of health and welfare and its equitable distribution. Implementing primary healthcare is the optimal path to universal health coverage, the most fundamental healthcare service affordable by both residents and the government. In health governance, the principle of prevention should be steadfastly implemented, focusing on community-oriented social support networks, enabling people to achieve physical, mental, and social well-being within their social systems. Based on this, the following six areas can gradually improve the primary healthcare service network:

First, strengthen infrastructure development. Increase investment in infrastructure for primary healthcare institutions, ensuring advanced equipment and a good environment, enhancing their service level and appeal.

Second, enhance talent training and mobility. Develop policies encouraging medical professionals to serve in primary care, increasing primary healthcare talent through incentives and training. Establish a talent mobility mechanism, encouraging orderly movement of primary healthcare professionals between regions, sharing experiences and skills.

Third, advance information technology integration. Promote the informatization of primary healthcare institutions, establishing electronic health records and information sharing platforms, improving the efficiency and quality of medical services. Utilize internet technology to expand telemedicine services, distributing health resources more evenly across urban communities.

Fourth, intensify health education. Increase health education for residents, enhancing their awareness and trust in primary healthcare services. Through health knowledge dissemination and free medical camps, enhance residents' proactive use of primary healthcare services.

Fifth, improve comprehensive service capabilities. Introduce multidisciplinary, holistic services, including mental health and health management, transforming community health institutions from merely disease treatment centers to comprehensive platforms for health promotion and disease prevention.

Sixth, increase financial support. Enhance government financial support for primary healthcare services, ensuring sufficient operational funds for community health institutions, guaranteeing their normal operation and service provision.

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