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# Enhancing Traditional Chinese Medicine healthcare system in Taiwan post-COVID-19 pandemic: A strategic focus on specialization

Shun-Ku Lin<sup>a,b,c,d</sup>, Jung-Nien Lai<sup>d,\*</sup><sup>a</sup> Institute of Public Health, National Yang Ming Chiao Tung University, Taipei City, 112, Taiwan<sup>b</sup> Department of Chinese Medicine, Taipei City Hospital, Renai Branch, Taipei City, 106, Taiwan<sup>c</sup> General Education Center, University of Taipei, Taipei City, 111, Taiwan<sup>d</sup> The Institute of Traditional Medicine, National Yang Ming Chiao Tung University, Taipei City, 112, Taiwan

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## ABSTRACT

Despite the advancements in precision medicine, regenerative medicine, and smart healthcare, traditional Chinese medicine (TCM) remains vital in Taiwan, reflecting its cultural and historical heritage. TCM is commonly used in conjunction with or as an alternative to conventional medicine and is reimbursed by Taiwan's National Health Insurance, enabling the Taiwanese people to integrate traditional and modern treatments for comprehensive healthcare. This article explores the critical role of specialization in TCM amid evolving healthcare challenges. This highlights the need for specialized knowledge among TCM physicians to manage iatrogenic risks, such as drug-herb interactions, and to improve healthcare outcomes, particularly when integrating TCM with Western medicine. Specialization enhances treatment precision, patient outcomes, and clinical research quality. Drawing on South Korea's experience in establishing a specialist physician system for traditional Korean medicine, Taiwan's Ministry of Health and Welfare's initiatives to advance systematic TCM training and regulatory frameworks were examined, showcasing the development and implementation of a TCM specialist physician training program. In conclusion, specialized physician training in TCM improves patient care, optimizes healthcare utilization, and promotes long-term sustainability of the health insurance system by aligning TCM practices with modern healthcare needs.

## 1. Introduction

Traditional Chinese Medicine (TCM) in Taiwan, traditionally a primary healthcare service without distinct specializations, faces challenges in the modern healthcare landscape. With persistent efforts for more than four decades, various TCM specialties such as internal medicine, gynecology, pediatrics, acupuncture, and traumatology have been established in several TCM department of university-affiliated hospitals. However, because of the limited residency positions in hospitals, less than 1% of graduates have received comprehensive specialist TCM physician training [1].

This situation underscores the immediate need for a strategic re-evaluation of specialization within the TCM community in Taiwan, especially in light of the challenges posed by the COVID-19 pandemic. Given that TCM has been used for treating viral infections for more than a millennia, TCM physicians were able to quickly specialize in treating severe acute respiratory syndrome (SARS) during the pandemic. TCM

demonstrated efficacy in mitigating the severity of COVID-19 in Taiwan. However, without sufficient knowledge and specialized training, TCM physicians faced challenges in both self-protection and providing optimal care. The COVID-19 pandemic underscored the urgent need for systematic reform and specialization in the field of TCM in Taiwan.

Informed by the lessons learned from the 2003 SARS outbreak, Taiwan established a robust nationwide public health infrastructure to improve infection control for potential new epidemics. During the initial 50 days of the COVID-19 epidemic, Taiwan effectively utilized the centralized real-time database of the National Health Insurance (NHI) system to bolster disease surveillance and case identification. The Taiwan Centers for Disease Control responded comprehensively by leveraging innovative strategies using the NHI database, effectively delaying and containing community transmission within the country. Through daily online information updates, all healthcare providers, including TCM physicians, were rapidly educated to prevent acute viral transmission, comprehend self-protection measures, and appropriately

\* Corresponding author. No.155, Sec.2, Linong Street, Taipei, 112, Taiwan.  
E-mail address: [ericlai111@gmail.com](mailto:ericlai111@gmail.com) (J.-N. Lai).

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execute medical procedures under safe conditions, akin to specialists in acute viral infections. Drawing on its extensive experience in managing endemic diseases, the Taiwan Traditional Medicine Association issued the “Traditional Chinese Medicine Clinical Guidelines for COVID-19,” advocating the integrated use of the TCM formulae NRICM101 and NRICM102 for managing mild-to-moderate and severe-to-critical infections, respectively. The ability of all TCM physicians to prescribe NRICM101 and NRICM102 during the pandemic was crucial for public health, highlighting the adaptability and importance of TCM in emergency responses. The widespread and effective use of NRICM101 and NRICM102 highlighted the critical role of TCM in managing public health crises and underscored the need for specialization. Specialization in TCM would ensure that physicians are not only equipped with foundational knowledge, but also possess advanced expertise to respond to complex health challenges, integrating more effectively into Taiwan’s national healthcare system, and improving overall public health resilience. This also underscores the need for updated TCM specialist policies, especially for adapting to rapid advancements in technology and medical science [2–5].

## 2. Current landscape of TCM workforce and healthcare institutions in Taiwan

According to 2024 data, the distribution of TCM institutions varies by health insurance region (Table 1). The Taipei region has the highest concentration with 1307 institutions, while the Northern and Central regions have 536 and 1176 facilities, respectively. The Southern region has 595 institutions, Kaohsiung and Pingtung region has 621, and the Eastern region has 82 facilities. The total number of TCM facilities in Taiwan has grown from 2729 in 2003–4317 in 2024, reflecting a 1.58-fold increase, indicating a rising demand for TCM services [6]. Despite this growth, the TCM physician ratio of 3.3 per 10 000 individuals remains below the recommended 3.5–4.0 per 1000 in OECD countries. Regional variations persist, with the Central region having the highest physician density (4.6 per 10 000), while other regions, including Taipei and Kaohsiung, have lower densities (3.0–3.1 per 10 000) (Table 2). Compared to Western doctors, who average 23 per 10 000 people, Taiwan’s 7642 TCM physicians result in a relatively low care density [7].

## 3. Role of TCM family medicine specialists in shaping home healthcare policies in Taiwan

Between 2014 and 2022, TCM researchers conducted a series of pilot programs primarily in hospital settings to investigate the efficacy of TCM for cancer pain, post-acute stroke, acute abdomen, diabetic nephropathy, elderly urinary dysfunction, and dementia [8] and to accumulate relevant evidence of TCM in Home Health Care (HHC). In 2019, the Bureau of NHI initiated the “Integrated Home Health Care Plan” incorporating well trained TCM physicians into the HHC system. Simultaneously, the Department of Chinese Medicine and Pharmacy launched the “Establishing a Traditional Chinese Medicine Community

**Table 1**

Distribution of traditional Chinese medicine (TCM) healthcare institutions by health insurance region (2024).

Region	TCM Hospitals	TCM Departments in Hospitals	TCM Clinics	Total
Taipei	0	28	1279	1307
Northern	1	15	520	536
Central	1	36	1139	1176
Southern	1	25	569	595
Kaohsiung & Pingtung	1	22	598	621
Eastern	0	10	72	82
Total	4	136	4177	4317

**Table 2**

TCM physicians and population distribution by region (2024).

Region	TCM Physicians	Population	TCM per 10 000 individuals
Taipei	2301	7 523 339	3.1
Northern	1002	3 897 784	2.6
Central	2078	4 562 051	4.6
Southern	981	3 267 558	3.0
Kaohsiung & Pingtung	1119	3 640 677	3.1
Eastern	161	529 033	3.0
Total	7642	23 420 442	3.3

Healthcare and Long-term Care Service Network Plan” to build a nationwide comprehensive network for community healthcare and long-term care systems (including home healthcare) and provided postgraduate training on integrative therapy, combining TCM techniques tailored to the in-home needs of disabled individuals. To our knowledge, integrative HHC services may be the first of their kind globally, based on either previous pilot programs or scientific evidence, with service fees fully covered by Taiwan’s NHI [9]. Between 2019 and 2023, this plan has successfully trained 349 TCM physicians and facilitated the provision of 263 877 HHC services, addressing various conditions, including stroke (14.50%), dementia (10.05%), Parkinson’s disease (5.31%), and other cerebrovascular disease (3.21%) [10]. TCM plays complementary and/or alternative roles in the following three different types of HHC.

### 3.1. Type 1: home medical care

More than 87% (6871/7883) of TCM physicians in Taiwan work in clinics, providing outpatient services. After receiving administrative training related to home medical services and basic home healthcare training, TCM physicians can provide convenient home medical services for disabled patients. Services offered at home are generally similar to those provided in outpatient clinics, including treatments for conditions such as insomnia, gastrointestinal (GI) diseases, upper respiratory infections, constipation, and musculoskeletal pain. TCM offers alternative home treatments for insomnia, GI diseases, upper respiratory infections, and musculoskeletal pain using acupuncture, moxibustion, cupping therapy, and/or Tui Na. These TCM methods may provide instant relief and complement conventional treatments by reducing the dosage of hypnotics, NSAIDs, and analgesics or enhancing host innate immunity against pathogens (especially viruses).

### 3.2. Type 2: intensive home medical care

Unlike home medical care, TCM physicians should receive comprehensive training, including essential knowledge and access to appropriate facilities, before providing intensive home medical care for patients with ventilator dependence, advanced cancer, end-stage heart/renal failure, amyotrophic lateral sclerosis (ALS), Parkinson’s disease, or advanced dementia. First, understanding the basics of respiratory, renal, and cardiac functions and the underlying causes of conditions such as chronic obstructive pulmonary disease, ALS, muscular dystrophy, spinal cord injuries, chronic heart failure, and post-ICU care is essential. Second, basic knowledge of different types of ventilators or equipment and the ability to interpret changes in the patient’s vital signs (such as tidal volume, respiratory rate, and oxygen concentration) before and after TCM intervention. Third, basic skills in recognizing signs of respiratory and cardiac distress and changes in blood gas levels. TCM physicians require a blend of theoretical knowledge, continuous education, and hands-on training to ensure high-quality care and patient safety. In addition, TCM physicians can provide acupuncture and moxibustion to treat pressure ulcers and boost host immunity, preventing potential infection; cupping therapy and/or Tui Na for treating and/or preventing

muscle atrophy and joint contractures; and TCM diet therapy to ensure adequate nutrition.

### 3.3. Type 3: hospice palliative care

TCM physicians should receive specialized training and preparation, including essential knowledge and access to appropriate facilities, before providing in-home hospice palliative care. First, knowledge about ethical considerations in end-of-life care, including informed consent and patient autonomy. Second, familiarity with relevant laws and regulations regarding hospice care and patient rights. Third, ability to coordinate with other healthcare providers, including physicians, nurses, social workers, and spiritual care providers, and understand the essential techniques for sensitive and empathetic communication with patients and their families. Fourth, essential skills for discussing end-of-life care options, advance directives, and patient preferences. Fifth, the progression and management of common terminal illnesses (e.g., cancer, heart failure, and chronic obstructive pulmonary disease). Sixth, familiarity with pain management, symptom control (e.g., nausea, dyspnea, and constipation), and psychosocial support. To fully understand the goals of palliative care, which focus on improving the quality of life and managing symptoms rather than curing the illness, TCM physicians provide acupuncture and moxibustion for treating pain, pressure ulcers, nausea, and dyspnea; cupping therapy; and/or Tui Na for treating pain, muscle atrophy, and joint contractures.

Undoubtedly, specialization in home healthcare allows TCM physicians to gain in-depth expertise in managing different illness severity levels during in-home care, improving the quality of care. Given the complexity of modern medicine and the rapid expansion of medical knowledge, it is increasingly challenging for a single TCM physician to provide HHC as well as contemporary outpatient care in all areas of general medicine. Specialization in TCM home healthcare allows TCM physicians to provide more targeted and effective treatment plans through accurate diagnoses based on specialized home healthcare knowledge. Patients and their families may feel more confident and secure, knowing that their TCM physicians are experts in the specific area of their health concern and are able to communicate effectively with other healthcare providers.

The NHI Administration estimates that approximately 200 000 disabled Taiwanese (mostly older adults) require one of the three aforementioned types of HHC services. If only 5% of these patients require TCM services and each receives a weekly visit, this will still necessitate 520 000 visits annually. The current plan provides 349 TCM physicians (4.42% of total TCM physicians) with an annual care capacity of 65 969 visits. However, there is a substantial shortage of approximately 2404 TCM physicians, highlighting the urgent need for workforce expansion to ensure adequate care delivery. Furthermore, the postgraduate training program “Establishing a TCM Community Healthcare and Long-term Care Service Network Plan” represents an initial step towards developing TCM Family Medicine or HHC specialists. Establishing a comprehensive training program is imperative; specifically, courses in TCM family medicine regarding integrative HHC should be established in all TCM medical schools. Concurrently, the Taiwan Association of Traditional Chinese Medicine and Family Medicine should continue to provide postgraduate integrative HHC education and training based on different types of HHC and disease severity. Moreover, increasing incentives is crucial to encourage more TCM physicians to participate in the integrative HHC system and get certified as TCM family medicine specialists (or TCM HHC specialists). Implementing a guarantee per point in the value of HHC services may be a viable approach. Integrative HHC (HHC plus TCM techniques) provides more comprehensive, culturally appropriate, and effective TCM healthcare services for disabled populations, which are currently not included in the global budget. To avoid encroaching on the existing TCM global budget and the right of the public to access TCM services, funding for enhanced TCM medical services for patients with disabilities should

be allocated separately. This approach could be an accessible policy to leverage the strengths of TCM to improve the overall health outcomes and quality of life in the disabled population.

## 4. Enhancing equity in resource allocation in TCM through the add-on measurement of health outcomes

Currently, Taiwan’s NHI requires all TCM applications to use ICD-10-CM diagnosis codes with treatments and diagnoses according to traditional TCM principles for payment approval. However, disputes often arise because “TCM syndrome differentiation and treatment” can only confirm that the TCM physician is following traditional TCM theories for medication but does not consider health outcomes. Consequently, TCM physicians who provide effective TCM treatments may be denied payment if their treatments do not follow traditional TCM theories. To resolve these ongoing disputes, a solution would be to incorporate a global budget model focusing on health outcomes.

We suggest that the following health outcomes be established as goals under the global budget model to ensure equitable funding allocation.

### 4.1. Patient safety

The public often regards TCM as a natural and safe approach with few side effects. However, growing research highlights potential iatrogenic risks in TCM, including drug toxicity, tissue damage from acupuncture [11], and adverse interactions from concurrent use of TCM and Western medicine [12]. Chen et al. (2015) and Liao et al. (2010) have highlighted this issue. Chen et al. developed a database to track the interactions between multiple herbs in TCM and Western drugs using the NHI research database, which revealed significant interactions involving herbs like Ephedrae Herba and Angelicae Sinensis Radix/Angelicae Dahuricae Radix [12]. Liao et al. focused on the concurrent use of corticosteroids with licorice-containing TCM preparations, showing a notable prevalence of such combinations [13]. These studies underscore the need for comprehensive knowledge and systems to manage TCM and Western drug interactions effectively, ensuring patient safety and treatment efficacy.

To enhance the quality of Chinese herbal medicines, the Department of Chinese Medicine and Pharmacy of the Ministry of Health and Welfare (formerly the Committee on Chinese Medicine and Pharmacy) established the “National Adverse Drug Reaction Reporting System for Chinese Medicine” in 2001. This online reporting system has been used for TCM adverse drug reaction reporting for education and training during annual TCM seminars. Between 2001 and 2021, 1807 cases were reported. However, over 95% of these reports were from TCM physicians and pharmacists in hospital-affiliated TCM departments [14]. To further encourage adverse drug reaction reporting from TCM clinics, it is recommended to link the quantity and quality of adverse reaction reports to the frequency of TCM prescriptions. These could be included as different points in the quality payment system, thereby providing the public with safer, more valued, and well-treated services.

### 4.2. Preventive care utilization

TCM is highly effective in preventive medicine for several diseases, using various tools and methods to enhance immunity, balance the body’s energy, and reduce inflammation. By integrating customized herbal formulations, regular acupuncture sessions, tailored dietary advice, manual therapy (Tui Na), exercise, Qigong, and lifestyle recommendations, TCM prevents the onset of diseases such as upper respiratory virus infection, GI upset, and the progression of metabolic disorders, cardiovascular diseases, and renal diseases. The goal of TCM preventive medicine, whether to promote overall well-being or reduce subsequent medical expenses, is different from the treatment of acute or chronic conditions. Therefore, distinct points should be established in

the quality payment system for prevention and treatment.

#### 4.3. Clinical outcomes or efficiency of care

In addition to using treatments and diagnoses according to traditional TCM principles as a tool for payment approval, we suggest that by using ICD-10-CM diagnosis codes to track conditions and treatments, TCM physicians also focus on patient outcomes such as the change in blood sugar levels in diabetes, blood pressure in hypertension, VAS score of pain, and sleep quality, rather than the volume of services provided. Creating distinct metrics within the quality payment system will improve performance measurements, ensure efficient resource use, and reduce waste.

### 5. Enhancing the quality of TCM care through specialization

Before the formal initiation of specialization in TCM in Taiwan, the National Union of Chinese Medical Doctors' association proactively developed specialized treatment approaches for specific diseases. These efforts received enhanced reimbursements from Taiwan's NHI, acknowledging the effectiveness and importance of specialized care. Stroke and cancer treatments, in particular, received the highest levels of participation and specialization. These aspects include diagnostic methods, classification, corresponding laboratory data, and medications typically used by Western medical specialists. To provide suitable and safe TCM interventions, physicians require a strong foundation in relevant fields, an understanding of the potential interactions between Chinese and Western medicine, and exceptional observational and clinical judgment skills. This comprehensive expertise is essential for optimizing TCM therapies and potentially surpassing the outcomes observed in generational studies. Chu et al. conducted a survey of clinical Traditional Chinese Medicine physicians, including graduates of TCM educational programs and those who had cleared specialized exams. A total of 1308 questionnaires were distributed. The findings revealed a consensus among clinical physicians in favor of implementing a TCM specialist training system [15], which underscores the need for TCM to evolve from general community medical conditions into specialized fields to meet future service demands. TCM includes various specialties, such as oncology, family medicine specialists (or TCM HHC specialists), pediatrics, gynecology, internal medicine, trauma, and acupuncture (pain management).

#### 5.1. TCM oncologist

TCM has shown notable public health benefits in cancer care, as evidenced by various studies using the NHI Research Database. Liao et al. (2015) demonstrated that TCM as an adjunct therapy improved survival rates in liver cancer patients, highlighting the efficacy of specific TCM formulations [16]. Liu et al. (2016) observed similar survival benefits in metastatic prostate cancer patients using TCM, particularly with Chai-Hu-Jia-Long-Gu-Mu-Li-Tang [17]. Additionally, Liao et al. (2017) reported reduced mortality in lung cancer patients treated with TCM, with Qing Zao Jiu Fei Tang being notably effective [18]. Huang et al. (2021) highlighted the role of TCM in reducing chemotherapy-induced stroke, indicating its potential for mitigating chemotherapy risks [19]. Lai et al. demonstrated that, among those tamoxifen-treated female breast cancer survivors in Taiwan, consumption of Chinese herbal products containing coumestrol, genistein, daidzein, *Angelica sinensis* or *Panax ginseng* is negatively correlated with subsequent endometrial cancer risk [20]. Furthermore, Lee et al. (2014) observed a significant decrease in all-cause mortality among advanced breast cancer patients receiving TCM, with certain agents like *Hedyotis diffusa* proving most effective [21]. These studies collectively indicate TCM's potential to improve survival rates and reduce treatment-related complications within Taiwan's healthcare system.

Recent advances in molecular biology and genomics have enabled

the identification of various breast cancer subtypes, providing insights into recurrence risks and treatment responses, and facilitating more personalized treatment approaches. The emergence of immunotherapy and newer targeted therapies, including CDK4/6 inhibitors (e.g., palbociclib) and PARP inhibitors for BRCA-mutant cancers, checkpoint inhibitors, and more refined molecular profiling techniques in the past decade, reflects a deeper understanding of breast cancer biology, leading to more effective and individualized treatment strategies. To become an oncologist, it is essential to be affiliated with and supervised by an approved residency-training program. Similarly, TCM oncologists should have basic knowledge of precision diagnosis for various subtypes of breast cancer and the mechanism, efficacy, and side effects of standard breast cancer treatments. They should be able to integrate TCM treatment options with the oncologist's diagnosis and evaluate their benefits and side effects before and after TCM interventions. To encourage TCM physicians to provide high-quality TCM services, additional funding outside the operating global budget is recommended.

#### 5.2. TCM stroke specialist

Stroke caused by bleeding or blockage in the brain's blood supply is a fatal condition. Several cohort studies using data from the NHI Research Database in Taiwan have revealed acupuncture as an adjuvant therapy for stroke, demonstrating promising results in reducing post-acute stroke comorbidities. A meta-analysis by Wu et al. (2022) revealed that acupuncture significantly reduced the risk of poststroke comorbidities such as stroke recurrence, acute myocardial infarction, pneumonia, dementia, epilepsy, and urinary tract infection [22]. Similarly, Chang et al. (2016) reported that stroke patients receiving adjuvant TCM therapy exhibited decreased risks of poststroke complications like urinary tract infection, pneumonia, and epilepsy, as well as reduced mortality [23]. Additionally, Lu et al. (2022) reported that adjuvant TCM therapy was associated with lower long-term mortality in stroke patients [24]. Moreover, Shih et al. (2015) indicated that acupuncture treatment was associated with a reduced risk of stroke recurrence [25]. Their follow-up study in 2017 further demonstrated that acupuncture treatment was linked to a decreased risk of dementia in non-hemorrhagic stroke patients [26]. Effective stroke management requires a coordinated effort across acute, sub-acute, and post-acute stages, with seamless communication among the healthcare team to optimize recovery and improve outcomes. Stroke care typically involves a multidisciplinary team. During the acute stage (within 24–72 h), neurologists, emergency medicine physicians, radiologists, neurosurgeons, and intensive care specialists play crucial roles. Neurologists, rehabilitation physicians, physical therapists, occupational therapists, and social workers play major roles during the subacute stage (several days to weeks). During the post-acute stage (weeks to months), primary care physicians oversee long-term health management, monitor chronic conditions, and coordinate care with specialists, continuing to work on improving function and independence through outpatient or home-based rehabilitation services. Similarly, a TCM specialist for treating the subacute stage of stroke should have basic knowledge of neurology, internal medicine (many patients have at least one chronic disease), and the mechanism, efficacy, and side effects of prescribed Western medicine. They should be able to identify acupoints and TCM treatment options that complement the neurologist's diagnosis and treatment and be able to evaluate the benefits and side effects of each option before and after TCM interventions.

To provide effective care during the post-acute stage of stroke, it is imperative to familiarize TCM family medicine specialists (or TCM HHC specialists) with ongoing follow-up for stroke-related issues, medication management, and prevention of recurrent strokes, in-home, and hospice care. Notably, all TCM specialists (including acupuncturists, TCM internal medicine and family medicine specialists) should be well-trained in acupuncture for treating stroke, especially in avoiding acupuncture-related adverse events such as nerve injury, cellulitis, and potentially



life-threatening complications such as iatrogenic pneumothorax or severe bleeding during TCM intervention [11].

## 6. Specialist physician training in Traditional Korean Medicine

South Korea is the first Asian country to establish a specialist physician system for Traditional Korean Medicine (TKM). The TKM system encompasses a comprehensive clinical specialist training program, including four years of clinical training in designated specialty training hospitals [27].

Specialties in TKM encompass eight fields: internal medicine, acupuncture and moxibustion, rehabilitation, obstetrics and gynecology, neuropsychiatry, otolaryngology, dermatology, Sasang constitutional medicine, and pediatrics.

For a hospital to qualify as a TKM specialist training institution, it must establish at least five specialty departments, including internal medicine, acupuncture, and moxibustion, and three additional specialties. Hospitals must provide sufficient outpatient and inpatient services. The Korean Medical Hospitals Association oversees these training hospitals, ensuring that they meet the required standards for specialist training in TKM [28].

TKM specialist accreditation enhances healthcare quality through standardized education and rigorous licensing to ensure that physicians are well trained and competent, resulting in better patient outcomes. Additionally, formal recognition and structured regulation of TKM have increased public confidence in traditional medical practices. The association with national pride and cultural heritage further reinforces this trust among the population. Moreover, the establishment of research institutes and academic organizations has stimulated ongoing research and development in TKM, leading to the discovery of new treatments and therapies that contribute to the overall medical knowledge base. This specialist accreditation process has facilitated the integration of TKM with modern medical practices, allowing licensed physicians to collaborate with conventional medical professionals and offer complementary treatments that enhance patient care. These benefits highlight the success of the Korean government's adoption of this system and underscore the importance of continued support for specialist accreditation of traditional medical practices [29,30].

The implementation of integrative medical services in South Korea, particularly through the establishment of accountable care organizations (ACOs), served as a robust model that Taiwan could adopt to enhance TCM specialist training. South Korea initiated the Korean-style ACO pilot program in early 2020, designating one hospital per region to improve care quality, reduce costs, and promote coordinated care [31]. This program integrated TKM with Western medical practices, focusing on prevention, chronic disease management, and palliative care, which significantly benefited from the extensive use of TKM by older adults. Additionally, South Korea has recognized the need for collaborative practice between TKM and Western medicine doctors, although there are different perspectives on the efficiency and practicality of such integration.

In Korea, integration is driven by a high demand for TKM and a relatively large workforce of TKM physicians. This facilitated the utilization of TKM practices in primary care, significantly improving access to healthcare and the management of chronic diseases [32]. The introduction of TKM-based primary care physicians (PCPs) acted as gatekeepers, effectively reducing the concentration of patients in tertiary hospitals and promoting a more efficient use of healthcare resources [33]. Furthermore, South Korea's experience highlights the importance of payment reform; shifting from the traditional fee-for-service model to value-based alternative payment systems such as ACOs has incentivized cost-effective and quality-driven care.

Taiwan can benefit from adopting similar strategies by integrating TCM into its national healthcare system. This could involve establishing TCM-based ACOs, promoting cooperative practices between TCM and Western medicine physicians, and enhancing interdisciplinary medical

education to produce dual-licensed doctors. These initiatives would not only improve the overall quality of healthcare but also ensure that TCM specialists are well equipped to meet the demands of a modern healthcare environment. By leveraging South Korea's successful integration of traditional and conventional medicine, Taiwan can create a holistic, efficient, and patient-centered healthcare system.

To address the current clinical challenges faced by TCM physicians in hospitals, we recommend implementing policies that require dual-licensed medical doctors (DLMDs) in hospital wards while allowing single-licensed physicians to operate in outpatient clinics, ensuring that inpatient care benefits from the integrative expertise of DLMDs and allowing TCM physicians to participate in clinical-related business training within the Western Medicine Society after graduation to obtain relevant skills and qualifications that will equip them to handle complex clinical situations effectively. By leveraging South Korea's successful integration of traditional and conventional medicine, Taiwan can create a holistic, efficient, and patient-centered healthcare system. These initiatives would not only improve the overall quality of healthcare but also ensure that TCM specialists are well equipped to meet the demands of a modern healthcare environment.

## 7. Enhancing specialist training in TCM: integrating postgraduate education and clinical practice

To develop a robust training program for specialist TCM physicians in Taiwan, it is crucial to draw on successful models from other regions. A detailed comparison of TCM education in China and Australia highlights several key factors that can inform the establishment of an effective training framework [5]. Both the Beijing University of Chinese Medicine (BUCM) and RMIT University in Australia emphasize the integration of Western medical sciences with TCM education, ensuring that graduates are well-equipped for competent and safe clinical practice. For instance, the BUCM curriculum requires students to complete a comprehensive program that includes 2856 h of compulsory theoretical studies, 468 h of electives, and 48 weeks of clinical practice. This rigorous approach is complemented by a focus on evidence-based TCM development, which is essential for gaining acceptance and integration into broader healthcare systems. In contrast, the RMIT program places strong emphasis on practical skills, including case studies, workshops, and clinical training, which help develop critical thinking and research capabilities among students. Adopting similar principles in Taiwan, such as integrating Western medical training and focusing on practical, evidence-based CM education, could substantially enhance the quality and effectiveness of TCM specialist training, ultimately benefiting the healthcare system.

Postgraduate specialist training in TCM is essential for ensuring high standards of practice and integration within broader healthcare systems. In China, significant progress has been made towards the development of postgraduate programs, including master's and doctoral degrees, that focus on advanced clinical skills and research capabilities. By 1983, several Chinese institutions had introduced doctoral programs, and the ongoing development of integrated training frameworks ensured that TCM physicians were well-versed in both TCM and modern Western medical sciences. The integration of Western medicine into TCM training is exemplified by the curriculum at BUCM, where students undergo substantial biomedical and clinical training. In Australia, although the integration of TCM and Western medicine is still in its infancy, initiatives such as the collaboration between RMIT University and Northern Hospital in Melbourne have provided valuable clinical training opportunities for senior TCM students. These initiatives have been well-received by both patients and healthcare providers, highlighting the potential of similar approaches in Taiwan to enhance the training of specialist TCM physicians.

A comparison of TCM higher education in Taiwan and China revealed similarities and distinct differences in their respective educational approaches. In Taiwan, TCM education is highly integrated into

Western medical training. Taiwanese TCM programs, especially the 8-year undergraduate program and the 5-year post-bachelor program, emphasize a comprehensive curriculum that includes both TCM and Western medicine. In contrast, China's TCM education system is more diverse and flexible. Chinese TCM education includes both 5-year and 7-year programs, with the 7-year program offering a direct pathway from the undergraduate to graduate level. Both systems offer valuable lessons for the ongoing development and specialization of TCM education [34].

## 8. Enhancing economic efficiency and reducing healthcare expenditures in TCM specialization

Improving the economic efficiency of healthcare payments and reducing medical expenditures in TCM specialization in Taiwan requires a comprehensive approach to integrating TCM into the broader healthcare system. Stronger collaboration between TCM physicians and other physicians significantly improves patient outcomes and reduces avoidable hospitalizations and healthcare costs. For instance, a study on breast cancer survivors revealed that patients with high connectivity between their TCM and other physicians had lower odds of avoidable hospitalization (adjusted odds ratio 0.86; 95% confidence interval (CI), 0.78–0.96) and lower mortality rates (adjusted hazard ratio [aHR], 0.82; 95% CI, 0.72–0.93) [35].

Additionally, the high prevalence of non-prescribed Chinese herbal medicines (CHM) poses a challenge to the economic efficiency of TCM services. One study found that 74.8% of individuals in Taiwan purchased non-prescribed CHM, which is associated with higher healthcare expenditures and potential adverse health effects. To address this, policies promoting the use of physician-prescribed CHM and enhancing patient education on the risks of non-prescribed CHM could reduce unnecessary expenditures [36].

The integration of TCM into the care of patients with chronic conditions, such as heart failure, has also demonstrated significant economic benefits. A nationwide cohort study showed that compared with heart failure patients who are non-TCM users, heart failure patients who received TCM treatment had lower hospitalization costs and a reduced risk of mortality (aHR 0.32; 95% CI, 0.20–0.52). These findings highlight the potential of TCM to reduce healthcare costs by improving patient management and reducing hospital admissions [37].

Moreover, incorporating TCM into dementia care plans reduces the need for advanced nursing care and the associated medical expenses. Patients with dementia who used TCM had lower hospitalization costs and shorter hospital stays compared with non-TCM users (aHR 0.61; 95% CI, 0.56–0.66). This evidence supports the integration of TCM into comprehensive care plans to enhance economic efficiency and reduce overall healthcare expenditure [38].

By leveraging these findings, Taiwan can enhance the economic efficiency of its healthcare system by integrating TCM into various aspects of patient care, thereby reducing avoidable hospitalizations and promoting the appropriate use of prescribed CHM. These strategies would not only improve patient outcomes but also contribute to significant cost savings in the healthcare system.

The successful integration of TCM into broader patient care strategies necessitates a high level of expertise and specialization among TCM physicians, which ensures that they gain in-depth knowledge and skills tailored to specific medical conditions, enabling them to work effectively alongside other healthcare professionals. This collaboration is essential for optimizing patient care and achieving the economic benefits outlined in previous sections.

For instance, when managing complex conditions, such as heart failure or dementia, specialized TCM physicians can provide targeted treatments that complement conventional therapies and reduce the overall burden on the healthcare system. Their expertise allows for the precise application of TCM interventions, minimization of risks, and enhancement of therapeutic outcomes. This level of specialized care not only contributes to improved patient health but also supports the

sustainability of TCM within the national healthcare framework by demonstrating its value in reducing costs and improving efficiency.

## 9. Comparative analysis of the supervising physicians training program and TCM specialist training

The current training program for supervising physicians in traditional Chinese medical care institutions aims to strengthen their supervisory roles, with the primary goal of developing TCM physicians with holistic medical capabilities, thereby promoting the sound development of TCM healthcare institutions [39]. In contrast, TCM specialist training focuses on producing TCM physicians with deep expertise in specific areas such as family medicine, acupuncture, obstetrics and gynecology, pediatrics, and internal medicine [40,41]. The key differences between these two training programs lie in their objectives, training institutions, course content, duration, and evaluation methods. Specialist training involves more intensive and specialized courses, often extending beyond 2 years, with a strong emphasis on research and advanced clinical practice. This comparative analysis clarifies the distinct advantages of the specialization system in developing highly skilled and knowledgeable physicians in specific TCM fields, thereby enhancing patient care quality.

## 10. Advancements in TCM specialist training and accreditation in Taiwan

In recent years, the Ministry of Health and Welfare in Taiwan has made dedicated efforts to advance systematic training in TCM. This initiative encompasses several key actions, including implementing a responsible physician training system for TCM, training clinical TCM faculty, establishing a TCM clinical skills testing center, and developing a TCM specialist physician training program. Since 2017, a structured system for TCM specialist physicians has been under discussion, leading to the development of a specialist medical society evaluation system that supports medical societies in their capacity to implement these plans. The "Society of Internal Medicine of Traditional Chinese Medicine" and the "Chinese Acupuncture Association of Acupuncture Medical Society" were the first to advance their respective specialist training systems through this evaluation process.

In 2018, training venues for these two specialties were selected, followed by the selection of qualified training hospitals in 2019. After trial evaluations confirmed their teaching capacities, a pilot program for TCM specialist physician training was initiated. This program is continuously reviewed and refined to improve the TCM specialist system. To address the critical shortage in the TCM workforce needed for HHC demand for disabled Taiwanese, the Taiwan Association for Traditional Chinese Medicine (of Family) diligently enhances courses focused on home care and long-term care. Additionally, they have been striving to establish official regulations and administrative procedures under the Ministry of Health and Welfare for the certification of TCM family physicians (or TCM home care specialists) after over two decades of actively promoting and developing this specialty. To ensure that the system was comprehensive and appropriately regulated, the Ministry of Health and Welfare developed specific regulations to serve as the legal basis for managing TCM specialist training, accreditation, and certificate renewal.

Consequently, the Ministry has introduced a draft method for the classification and examination of TCM specialist physicians in 2021, a crucial step towards formalizing this vital healthcare initiative. Since 2022, the Ministry of Health and Welfare in Taiwan has entrusted professional medical societies with the pilot implementation of specialist physician training programs in various TCM disciplines, including internal medicine, acupuncture, traumatology, pediatrics, gynecology, and family medicine. This initiative aims to enhance the expertise within the TCM medical community, elevate the standard of care, and align TCM practices with contemporary healthcare needs.

## 11. Conclusion

Integrating specialized physician training within TCM has various benefits beyond improving individual physicians' competencies; it also presents significant advantages for the health insurance system. Specialized training ensures that TCM physicians are better equipped to provide targeted, efficient, and effective treatments, leading to improved patient outcomes and satisfaction. This level of proficiency can reduce unnecessary interventions, thereby optimizing resource utilization and potentially reducing healthcare costs. Furthermore, with specialists in various TCM disciplines, the health insurance system can cover a wider range of services, meeting diverse patient needs more effectively. Additionally, aligning TCM practices with evidence-based approaches through specialized training facilitates smoother integration into existing health insurance frameworks, ensuring consistency and reliability in healthcare delivery. Overall, the implementation of a structured specialist training program in TCM not only augments the quality of care but also enhances the overall efficiency and sustainability of the health insurance system, ultimately benefiting both physicians and patients.

## Ethical approval of studies and informed consent

This study was categorized as a review study and did not involve human or animal experiments; therefore, exempted from ethical approval and informed consent requirements.

## Disclosure instructions

None.

## Declaration of Competing interest

The authors of the manuscript titled "Enhancing Taiwan's Traditional Chinese Medicine Healthcare System Following the COVID-19 Pandemic Through Specialization in TCM" declare that there are no financial or non-financial conflicts of interest that could have influenced the work reported in this manuscript.

**Financial Conflicts of Interest:** None.

- No author has received honoraria, educational grants, or participated in speakers' bureaus.
- No author has membership, employment, consultancies, stock ownership, or other equity interests in relevant companies.
- No author has provided expert testimony or has patent-licensing arrangements related to the content of the manuscript.

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- No author has personal or professional relationships, affiliations, academic competition, or intellectual passions that might affect objectivity.
- No author holds knowledge or beliefs that might affect the objectivity of the work reported.

The authors affirm that the research findings are presented as objectively as possible, ensuring that the results and discussion are evidence-based and free from any potential bias.

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