

# A study on Macau's role in the eastward spread of western medicine from the perspective of procedural grounded theory

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**Abstract.** *Objective:* This study aims to elucidate the origins of the eastward spread of Western medicine, trace its dissemination in China, and examine Macau's role in this process. The objective is to verify the profound impact of the Western medical knowledge system on the healthcare system in Macau. *Method:* Research samples were extracted from ten classic medical history writings discussing the eastward spread of Western medicine or related to Western medicine in Macau. Based on procedural grounded theory, open coding, axial coding, and selective coding were performed using Nvivo. *Results:* A total of 798 coding references were generated, forming 39 concepts, six subcategories, and two categories, with "medical treatment" as the core category to construct a framework for analyzing Macau's role in the spread of Western medicine. *Conclusion:* Macau served as the initial entry point for Western physicians into China, facilitating the introduction of a significant number of Western drugs and medical techniques. Western medical missionaries established hospitals in Macau and extended their influence to mainland China. They also played a crucial role in disseminating Western medical knowledge by translating and compiling Western medical literature.

**Key words:** eastward spread of western medicine, procedural grounded theory, Macau

## Introduction

The late Ming and early Qing periods marked the zenith of Western scientific dissemination in China, initiating the eastward spread of Western medicine (1-4). Western missionaries, including Mathew Ricci (5), Robert Morrison (6), Thomas Richardson Colledge (7), etc., undertook arduous journeys across the seas, engaging in activities termed "spiritual hunting" while adopting an approach of assimilating Chinese culture. They emphasized the use of scientific knowledge to aid in their missionary work. Upon comparing Eastern and Western medical sciences, they noticed significant disparities between the medical practices of the two regions. They facilitated the introduction of Western medical knowledge into China through various means, such as dispatching Western medical missionaries, distributing medical texts, and establishing Western

medical institutions. Simultaneously, traditional Chinese medical and pharmaceutical cultures were also disseminated to the West by these missionaries (3,5,8). Macau served as a hub for these missionaries. Western missionaries (including medical personnel) often landed in Macau and traveled via the Pearl River to the provincial capital of Guangzhou. They then proceeded northward along the ancient Meiling Trail to the interior regions of Jinghua, spreading Western culture. In 1569, the first Catholic bishop of Macau, D. Melchior Carneiro, established China's first Western hospital, S. Raphael's Hospital, also known as the "Baimahang Hospital" or "Yi Ren Temple". This hospital was pivotal in introducing cowpox vaccination to China (9). Following the Opium Wars, with the influx of Portuguese governance, economic, and cultural influences, Western medicine rapidly spread and dominated the medical field in Macau (10,11). Traditional

Chinese medicine transitioned from a dominant to a subordinate role. Existing Western medical clinics and hospitals run by foreigners in Macau were expanded, and Western medical schools were established. Thus, Macau was the cradle of the eastward spread of Western medicine and played a significant role in the cultural exchange of medical knowledge between the East and the West. This study aims to delineate the origins and trace the trajectory of Western medicine's spread in China, to explore Macau's role in this process, and to investigate the profound impact of the Western medical knowledge system on Macau's healthcare. Data for this qualitative study was extracted from 10 classic medical history writings, forming 103 excerpted texts, and was analyzed using a procedural grounded theory approach.

## Materials and methods

### *Source of data*

The selection criteria for the samples in this study were primarily based on the three principles of theoretical sampling (12). First, the principle of typicality of the research subject was considered. By taking into account factors such as the author's influence, publishing entity, and publication year, 10 classic medical history writings were selected (Table 1). Second, the principle of content adaptability of the research subject was considered. This involved excerpting content related to the eastward spread of Western medicine or Western medicine in Macau from these classic works. Finally, the convenience of data and material acquisition for

**Table 1.** List of classic texts selected for this study.

Name (of a thing)	Author	Publishing unit	Year of publication
The Health Department of Macau: Developments since the Fourth Century	Macau Health Bureau	Macau Health Bureau	1999
Records of Social Life in Macau after the Opium War: Selected Materials on Modern Macau	Tang Kaijian/Chen Wenyuan/ Ye Nong (eds.)	Flower City Publishing House	2001
Guangdong Province - Health Chronicles	Guangdong Provincial Local Records Compilation Committee (ed.)	Guangdong Provincial People's Publishing House	2003
A New History of Macau (Book III)	Wu Liangzhi/Jin Guoping/Tang Kaijian	Macau Foundation	2008
A History of Lingnan Medicine (First Book)	Liu, Xiaobin/Zheng Hong (eds.)	Guangdong Science and Technology Press	2010
Medicine Introduced from the West in the Ming Dynasty	Fan Xingzhun (Author), Niu Yahua (Proofreader)	Shanghai Century Publishing Group	2012
Between Form and Spirit: A History of the Introduction of Early Western Medicine to China	Dong Shaoxin (Author)	Shanghai Ancient Books Publishing House	2012
A History of Western Medicine's Progression to the East	Shudong Qi (ed.)	China Press of Traditional Chinese Medicine	2016
The Horn of Celestial Alienation: Western Civilization in Macau from the 16th to the 19th Century (Volume 2)	Tang Kaijian (Author)	Jinan University Press	2016
Ten Memoirs of Western Medicine in China	Su Jing (Author)	China Book Council (PRC state-run publication)	2020



**Figure 1.** Word frequency cloud of the texts.

the research subject was taken into account. The excerpted content was converted into analyzable texts, resulting in a compilation of 103 excerpted texts. A frequency analysis of these texts revealed that terms such as ‘Macau’, ‘doctor’, ‘hospital’, ‘China’, ‘medical’, ‘patient’, ‘pharmacy’, ‘medicine’, and ‘missionary’ appeared frequently (Figure 1).

### *Research method*

Grounded theory, an essential method for qualitative research, was introduced by Glaser and Strauss in 1967 (13). It involves theoretical sampling, coding, and analysis of data, culminating in the construction of a theory (14). Currently, grounded theory is broadly categorized into three schools: classical grounded theory, procedural grounded theory, and constructivist grounded theory. The core of classic grounded theory is to develop a theory from field data through a systematic process of data collection and analysis, rather than from a pre-established theoretical framework (13). Procedural grounded theory builds on classic grounded theory, with more emphasis on systematic and procedural steps and technical details (15). Constructivist grounded theory, influenced by social constructivism, emphasizes the interaction and co-construction between the researcher and the research subjects (16).

In this study, procedural grounded theory (15) was primarily employed. We used the qualitative analysis software NVivo to perform three levels of coding

on 103 report texts. The first level, open coding, involves a preliminary analysis of the raw data with an open mindset. Each sentence is conceptualized, and the scope of these concepts is determined. The second level, axial coding, further refines the concepts and categories obtained from open coding, identifies the relationships between these categories, and organizes them systematically. The third level, selective coding, involves selecting a core category after a comprehensive analysis and linking it with other categories. A multi-dimensional network of all categories and concepts is constructed around this core category, ultimately leading to the formulation of research conclusions.

## **Results**

### *Open coding*

Open coding encompasses two steps: conceptualization and categorization (14,15). In the first step, conceptualization, the analysis texts were segmented and refined. Using NVivo for coding, 798 coding references were generated, resulting in 39 distinct concepts. The second step, categorization, involved cluster analysis and categorization of these concepts, leading to the formation of six subcategories: Western doctors, Western pharmaceuticals, Western hospitals, Western medical techniques, human anatomy writings, and Western treatment methods writings (Table 2).

**Table 2.** Categories, subcategories, and concepts formed through open and axial coding.

Category (n)	Subcategory (n)	Concept (n)
medical treatment (742)	Western doctors (345)	1. T.R.Colledge (33)
		2. Ant3nio de la Concepci3n (32)
		3. Melchior Carneiro (28)
		4. Robert Morrison (27)
		5. Johannes Schreck (26)
		6. Isidoro Lucc (25)
		7. Martin Palau (22)
		8. Blasius Garcia (20)
		9. Joao Baptista Lima (20)
		10. Alexander Pearson (18)
		11. Bernard Rhodes (18)
		12. Benjamin Hobson M. B. (16)
		13. Diego Rho (11)
		14. Matteo Ricci (10)
		15. Jhon Livingston (9)
		16. P.Parker (9)
		17. E.D.Bridgeman (8)
		18. Michael Boym (7)
		19. William Lockhart (6)
	Western pharmaceuticals (188)	1. pharmacy (83)
		2. introduction of Western medicine (59)
		3. pharmacists (46)
	Western hospitals (135)	1. St. Raphael's Hospital (53)
		2. Hospital Conde S. Janu3rio (22)
		3. Macau Hospital (20)
		4. Macau Eye Hospital (12)
		5. Macau Leprosarium (12)
		6. Macau St. Paul's College Clinic (10)
		7. Morrison Eye Clinic (6)
	Western medical techniques (74)	1. surgical treatment (31)
		2. cowpox inoculation (27)
		3. bloodletting therapy (16)
medical writings (56)	human anatomy writings (37)	1. Quan Ti Xin Lun (15)
		2. Ren Shen Shuo Gai (11)
		3. Ren Shen Tu Shuo (11)
	Western treatment methods writings (19)	1. Xi Yi Lue Lun (6)
		2. Fu Ying Xin Shuo (5)
		3. Nei Ke Xin Shuo(5)
		4. Zhong Dou Qi Shu(3)

*Axial coding*

The six subcategories obtained from open coding were analyzed and integrated, leading to the formation of two main categories: “medical treatment” and “medical writings” (Table 1). Each coding was compared based on the number of reference points, forming a hierarchical structure diagram. The area of each node in the diagram is proportional to its frequency, meaning a larger area indicates a higher frequency of occurrence for that node (Figure 2).

*Selective coding*

The first step was to identify the core category. In our sample, terms such as ‘hospital’, ‘medical’, ‘doctor’, and ‘pharmacy’, which ranked high in word frequency, were all related to “Medical Treatment”. The coding reference points for the “Medical Treatment” category totaled 742, accounting for 92.98% of all coding reference points. Consequently, “Medical Treatment” was determined as the core category.

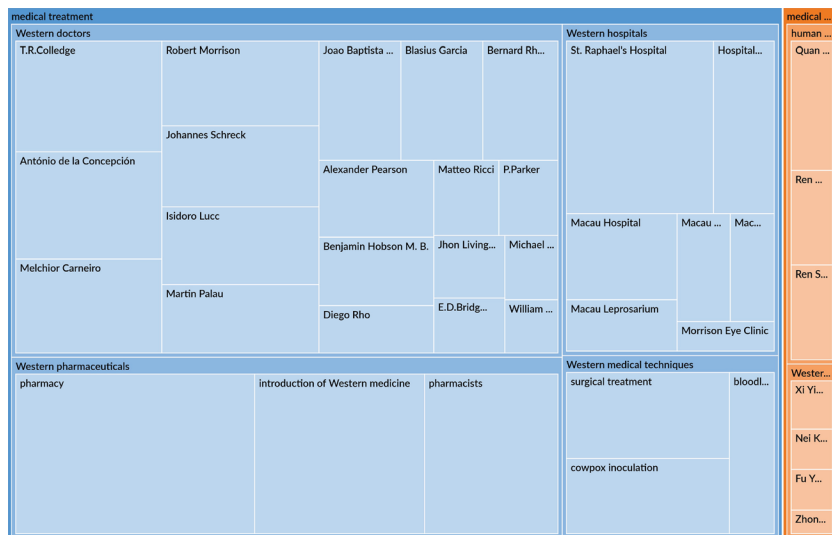
The second step involved developing a storyline to connect all categories and concepts using the core category, thereby revealing the research findings. At the onset of the eastward spread of Western medicine,

a significant influx of Western doctors, Western pharmaceuticals, and Western medical techniques entered mainland China via Macau. Western medical missionaries in Macau established Western hospitals and promoted them throughout mainland China. Additionally, these missionaries aided in the dissemination of Western medical knowledge by translating and compiling Western medical literature. Based on this, a framework analyzing Macau’s role in the eastward spread of Western medicine was constructed (Figure 3).

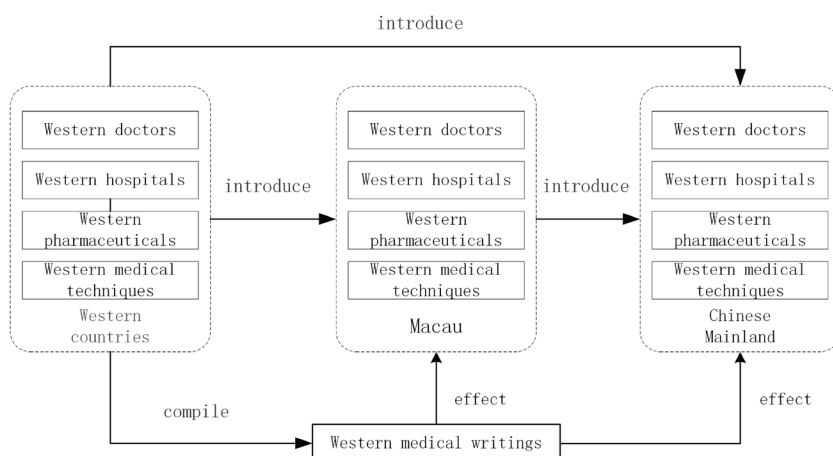
**Analysis of Macau’s role in the eastward spread of western medicine**

*Macau as the first stop for western doctors entering China*

Since the arrival of missionaries in China, Western medicine has been introduced into the country. The late Ming and early Qing periods marked the peak of Western scientific and technological transmission into China, with Western medicine being brought in alongside astronomy, calendrical science, mathematics, and geography. Western missionaries realized that using medicine as a means of proselytization gained



**Figure 2.** Hierarchical structure diagram based on the number of coding reference points.



**Figure 3.** Analytical framework of macau's role in the eastward spread of western medicine.

public trust more easily, gradually forming a strategy of “medical missionary work”. Numerous Western medical missionaries entered Macau to practice and spread their knowledge to mainland China. Key figures such as Melchior Carneiro, Johannes Schreck, Isidoro Lucc, Alexander Pearson, Robert Morrison, Jhon Livingston, T.R. Colledge, P.Parker, and Benjamin Hobson played significant roles in this movement.

Melchior Carneiro, established the first Western hospital in Macau. He was a Portuguese Catholic and Jesuit, appointed by the Pope and arrived in Macau in 1568. In 1569, he established the Misericordia and two hospitals, one of which was the Hospital de S. Rafael, also known as “Misericordia Hospital”, “Poor Man’s Hospital”, “Baimahang Hospital”, and “Yi Ren Temple”, along with a leprosy hospital. He was the first to bring Western medical science to China via Guangdong.

Johannes Schreck (P. Terentius) opened the first Western anatomy room in Macau. He was a renowned German doctor, mathematician, and naturalist who arrived in Macau in 1619 and set up an anatomy studio. In 1621, he traveled from Guangdong to Jiangxi, Hangzhou, Nanjing, and finally reached Beijing in 1623. He wrote *Taixi Ren Shen Shuo Gai*, describing European physiology and anatomy of the time, especially the muscular and nervous systems, and notably recognized the brain as the “center of perception”. He also authored *Thesaurus rerum medicarum novae*

*Hispaniae*, based on European discoveries in the New World. His medical expertise and safe surgical procedures earned him high esteem among the nobility. He began translating “*Ren Shen Shuo Gai*” but passed away before completing it.

Isidoro Lucc was the first Western doctor to come to China with the intention of serving at the court. An Italian Jesuit, he started studying medicine at 18 and obtained a doctorate in philosophy, theology, and medicine from Rome in 1689. He arrived in Macau on July 15, 1691, and in 1692, at the request of Emperor Kangxi, was dispatched by the Jesuit community in Macau to serve at the court along with Gao Zhu. Lucc’s detailed third-person account of his journey to China and medical practice at the court, titled *A European Doctor’s Successful Medical Practice in the Chinese Court*, is the only comprehensive document found on this topic and is invaluable for studying Western medical practices at the Chinese court. The appointment of Gao Zhu and Lucc to the court marked the beginning of Western doctors serving in the Qing court, initiating over a century of Western medicine at the royal court. Most Western doctors entered the court via Macau, reflecting the city’s role in introducing Western medicine to China.

Alexander Pearson introduced cowpox to mainland China from Macau. He was a doctor with the British East India Company stationed in Macau, tasked with providing medical services to the



company's senior executives, staff, and missionaries in China, and also treated local Macau residents in his free time. In 1803, he introduced cowpox to Guangzhou, and in 1806, he began training Chinese people in vaccination, cultivating China's first batch of medical professionals skilled in cowpox vaccination.

Robert Morrison was the first missionary to approach the Chinese using medicine. A British national, he arrived in Macau in 1807 as the first Protestant missionary in Macau. In 1820, he and Jhon Livingston opened an ophthalmology clinic in Macau. Although not a hospital in the true sense, it was the earliest medical institution established by missionaries in China and marked Morrison's entry point for medical missionary work. In 1827, he and T.R. Colledge established the Macau Ophthalmic Hospital.

Jhon Livingston was the first Western doctor to seek cooperation with Chinese medicine. He first came to China in 1808 and worked as an assistant doctor for the East India Company in 1812, becoming a company surgeon in 1815. In 1821, he was awarded a doctorate in medicine by Aberdeen's Marshall College of Medicine. In 1820, he collaborated with Morrison to open a medical clinic with an attached pharmacy stocked with Chinese medicines and established a specialized library of Chinese medical books, earning him the title *The first Western doctor to seek cooperation with Chinese medicine*.

T.R. Colledge established the Chinese Medical Missionary Association. He was a doctor with the Edinburgh Medical Society and joined the East India Company as a ship's doctor in 1819. In 1826, he came to China as an assistant doctor for the East India Company's Guangzhou trading post and moved to Macau in 1827 to set up an ophthalmic hospital. In 1838, he founded the Chinese Medical Missionary Association and served as its president. Dr. Colledge changed the previous Catholic practice of treating patients at the church, creating a new medical space in society: the "hospital". His popularity in Chinese communities through the Western-style hospital led to an understanding of the urgency of medical needs in Chinese society.

P. Parker opened the second hospital in Macau. An American Presbyterian minister and doctor, he arrived in China in 1834 and founded an ophthalmology clinic

in Guangzhou in 1835. Due to the increasing number of patients, he expanded his services and opened the Canton Hospital (now Sun Yat-sen Memorial Hospital of Sun Yat-sen University), the earliest and longest-standing foreign church hospital in China. In 1838, he opened the second hospital in Macau, the Chinese Medical Missionary Association's Macau Hospital, commonly known as the American Hospital.

Benjamin Hobson M.B.'s compilation of five Western medical books had a profound impact on the Chinese medical community. A British medical master, Hobson was appointed by the London Missionary Society to come to China in 1839. Initially arriving in Macau, he assisted William Lockart in medical work. In 1848, the society's directors decided to establish the Hui Ai Hospital in Shaji, Guangzhou, managed by Hobson. In 1850, the hospital treated a total of 25,497 patients. During the Second Opium War in 1856, angered Guangzhou residents destroyed the hospital, and Hobson moved to Shanghai to assist Lockart with a medical clinic, which later became Renji Hospital. While practicing medicine, Hobson also studied Chinese and published translations such as *"Quan Ti Xin Lun"* in 1851, *"Bo Wu Xin Bian"* in Guangzhou in 1855, *"Xi Yi Lue Lun"* in Shanghai in 1857, *"Nei Ke Xin Shuo"*, and *"Fu Ying Xin Shuo"* in 1858. Collectively known as Hobson's Five Western Medical Books, they significantly influenced modern Chinese society and the medical community.

#### *Western Medical Missionaries Establishing Western Hospitals in Macau*

The first Western hospital in China was St. Raphael's Hospital, also known as "Misericordia Hospital", "Poor Man's Hospital", "Baimahang Hospital", and "Yi Ren Temple". It was established in 1569 by Jesuit Bishop Melchior Carneiro. In addition to treating patients, it also provided shelter for the homeless. The hospital, with its strong religious overtones, initially claimed to accept all individuals regardless of their religious affiliation. However, in practice, it did not treat non-Christian Chinese, foreigners of other religions, or lower-class individuals who committed crimes. The hospital closed on October 31, 1975, after over 400 years of operation.

The Macau Leprosarium was the earliest and longest-running leprosy relief institution established by Western missionaries in China. Alongside establishing St. Raphael's Hospital in 1569, Carneiro also founded a leprosy hospital. Initially, St. Raphael's Hospital was located within the Misericordia, and the leprosy hospital was in a separate section within it. In the early 17th century, the leprosy hospital was moved near the Nossa Senhora da Esperanca church and relocated to an island in 1882. A new leprosy hospital was built in Coloane in 1929. Influenced by the Macau Leprosy Hospital, leprosy hospitals were also established in Guangzhou, Shaoguan, Zhaoqing, Foshan, Dongguan, and Chaozhou during the late Ming and early Qing periods.

Founded in 1594, the College of Saint Paul in Macau was a key Jesuit institution for training missionaries in the Far East and the first Western-style university in the region. Modeled after the Jesuit college established by Loyola in Rome, the College of Saint Paul included a clinic from its inception. Due to the difficulty of securing formal doctors and pharmacists for the Poor Man's Hospital and its pharmacy, doctors and pharmacists from the College of Saint Paul frequently treated patients there. The clinic and pharmacy at the College of Saint Paul were genuine medical institutions, equipped with advanced pharmaceutical tools and specialized medical personnel, open to the public, and played a pivotal role in early Macau society. They were widely welcomed and praised as "a better clinic".

Given the prevalence of eye diseases in the Guangdong-Macau region, T.R. Colledge established a specialized ophthalmic hospital in Macau in 1827. Funded by the foreign community in Macau, the hospital offered free treatment and eyeglasses to patients. It gained popularity and gratitude, attracting patients from Beijing, Nanjing, and Southeast Asia. Over six years, the hospital treated approximately 4,000 patients, primarily for eye conditions. The success of the Macau Ophthalmic Hospital inspired Dr. Colledge, who in 1828, along with American doctor James H. Bradford, established a hospital in Guangzhou to treat eye diseases, foot diseases, and various other ailments, also providing free medication to the impoverished Chinese. By 1832, Colledge succeeded Alexander Pearson as the physician for the British trading post in

Guangzhou and closed the Macau Ophthalmic Hospital. Although not a missionary, Colledge's successful efforts influenced the early American Baptist missionaries like P.Parker, who established hospitals in both Macau and Guangzhou, gradually forming the strategy of "medical missionary work".

Hospital Conde S. Januário, still operational today, is a public Western hospital that was inaugurated in 1874 as a military hospital, originally named "St. Januário Hospital", and exclusively served military personnel. Its design was inspired by the renowned Saint Raphael Hospital in Belgium, making it a relatively advanced Western hospital for its time. It underwent significant renovations in 1882. In 1919, following a reorganization of the health department, Governor Henrique de Sena Fernandes approved the "General Regulations of the Health Department of Macau", establishing new categories for St. Januário Hospital and renaming it the "Government General Hospital". It established necessary departments to accommodate patients based on disease, age, gender, race, religion, and social status. In 1937, Governor Artur Tamagnini de Sousa Barbosa renamed the institution as the Conde S. Januário Hospital in perpetual memory of its founder, as St. Januário had been conferred the title of Count prior to his death.

#### *Introduction of western pharmaceuticals to China via Macau*

Western medical missionaries primarily used Western medications for treatments. The source of Western pharmaceuticals in Macau was mainly from missionaries who brought or shipped them from the West, using Western methods of drug preparation. Macau played a crucial role as a transit point for Western pharmaceuticals entering China, introducing various notable Western medicines such as quinine, litharge, balsam, mercury preparations, and cowpox vaccine. Additionally, there was a demand for Western medications in the Chinese court, with Westerners in Macau frequently offering drugs as tribute. During the early Qing period, European envoys to China often included medicines among their gifts, predominantly liquid formulations and ointments, many of which were likely procured in Macau.



The earliest pharmacies in Macau were operated by various monastic orders. Both the Jesuits and Franciscans had their own pharmacies in Macau, purchasing medicinal materials from Europe, India, and China to prepare medications. These were used to treat not only missionaries but also the Chinese public. The Jesuit-run College of Saint Paul in Macau, established in 1594, included a pharmacy that began employing pharmacists around 1619. The pharmacy had a hall and a dispensing room, as well as a library housing famous European pharmacopeias, Indian medical texts, and Chinese medical classics. A manuscript preserved in the Roman Jesuit Archives titled “Compilation of Secret Recipes from the Principal Pharmacies of the Jesuits in Portugal, India, Macau, and Brazil – Formulated and Used by the Best Doctors and Pharmacists of These Regions” records 37 secret recipes developed by the College of Saint Paul’s pharmacy. At the time, this pharmacy was at a world-leading level, playing a pivotal role in Macau’s medical community. Its medications were often presented as tribute to the Chinese court. After the expulsion of Jesuit missionaries from Macau in 1762, the College of Saint Paul and its medical facilities were forced to close, and the pharmacy was sold to Goa. However, purchasing medications from Goa was fraught with difficulties, and people could only occasionally obtain European-ordered Western medications from Portuguese or other foreign private doctors. It wasn’t until 1780 that Portugal established two pharmacies in Macau: the Santos Pharmacy and the Freitas Pharmacy, both secular medical institutions operating under market conditions, primarily importing medicinal raw materials from Guangdong and Goa and producing them in the pharmacy.

#### *Introduction of western medical techniques to China via Macau*

Western missionaries initiated the introduction of Western medicine to China through surgical treatments, including cataract surgery, amputations, cyst excisions, bladder stone surgery, and hemorrhoid surgery. For instance, on the first day of P. Parker’s hospital opening, not a single patient arrived, and on the second day, only one woman tentatively sought consultation. However, Parker’s success in ophthalmic

surgery quickly changed the situation, attracting a large patient influx. Generally, in the 19th century, the first Western medical technique to capture the Chinese psyche and gain acceptance was ophthalmology, with surgeries in this field and some general surgical excisions being highly revered.

The first Western medical technique introduced was the cowpox vaccination. The practice of cowpox vaccination as a preventive measure against smallpox was adopted and spread from 1796, quickly gaining support from European royalty. By 1805, cowpox vaccination had reached Macau, making it one of the earliest regions in the world to adopt this practice. In 1806, Dr. Pearson began training Chinese individuals in cowpox vaccination, cultivating China’s first batch of medical professionals skilled in this technique. To ensure the continuity of cowpox vaccination, Pearson entrusted East India Company Secretary Stanghton to translate the vaccination technique into a book, resulting in the publication of “*Zhong Dou Qi Shu*”.

Bloodletting, a fundamental therapy in traditional European medicine, was also widely used in Macau and extended to mainland China. Among the doctors practicing in Macau, there were specialized bloodletters, and most surgeons were also proficient in bloodletting. In 1692, when selecting Western physicians to be sent to Beijing, Emperor Kangxi specifically requested a bloodletter, leading to the selection of the surgeon Gao Zhu and Father Isidoro Lucc to proceed to the court.

#### *Dissemination of Western Medical Knowledge through the Compilation of Western Medical Texts*

Western medical treatment is based on the anatomical system, and through anatomy, one can understand the tissues and structures of the human body. Benjamin Hobson, a British physician who worked in Macau, collaborated with Chen Xiutang from Nanhai to publish “*Quan Ti Xin Lun*” in 1851. This book primarily elaborates on anatomical physiology and represents a fusion of Western medicine and Chinese traditional culture. It was widely circulated and had a profound impact. Johannes Schreck, who set up an anatomy studio in Macau, translated “*Ren Shen Shuo*

*Gai*”, focusing extensively on the muscular and nervous systems. However, the book lacked content on internal organ anatomy, an indispensable part of anatomical studies. The Jesuit missionary in Macau, João de Loureiro, translated “*Ren Shen Tu Shuo*”, divided into two parts. The first half discusses the anatomy and physiology of the thoracic and abdominal cavities, while the latter half consists of 21 anatomical illustrations with descriptions, complementing “*Ren Shen Shuo Gai*”. These two books, “*Ren Shen Shuo Gai*” and “*Ren Shen Tu Shuo*”, are among the earliest Western anatomical works in China. Although not widely disseminated, they significantly enriched the Chinese understanding of the human body and medicine, marking an important milestone in the cultural exchange between China and the West.

Western treatment methods were also introduced to China through the translation of Western medical texts. In 1805, Alexander Pearson, a doctor with the British East India Company in Macau, commissioned East India Company Secretary Stanghton to translate cowpox vaccination techniques into a book. Co-published with the foreign merchant Zheng Chongqian, “*Zhong Dou Qi Shu*” detailed vaccination techniques and methods, gaining popularity and undergoing multiple reprints. In 1857, Benjamin Hobson, who also worked as a doctor in Macau, wrote “*Xi Yi Lue Lun*”, divided into three volumes. The first volume discusses general disease symptoms, the second focuses on specific parts of the body, and the third is dedicated to prescriptions and drugs, featuring over 400 illustrations. While the book is detailed in external symptoms, it briefly touches upon internal symptoms. To compensate for this shortfall in “*Xi Yi Lue Lun*”, Hobson wrote “*Nei Ke Xin Shuo*” in 1858, in two volumes, discussing disease symptoms and recording prescriptions and drugs. Though not as comprehensive as Johann Peter Frank’s works on Western internal medicine, its clarity and conciseness made it an important text for the introduction of Western internal medicine to China. Hobson also co-authored “*Fu Ying Xin Shuo*” with Jiangning official Guan Maocai, featuring 33 discussions and 41 illustrations. The book is straightforward and well-equipped with prescriptions, but out of concern for Chinese acceptance, it

omitted topics on difficult childbirth and Western medical instruments.

## Discussion

The pivotal role of Macau as a cultural and medical exchange hub is underscored by the influx of Western medical practitioners and the establishment of medical institutions. The initial introduction of Western medicine through Macau not only provided immediate medical benefits but also facilitated a broader cultural exchange. The translation and dissemination of Western medical texts played a crucial role in integrating Western medical knowledge into Chinese practices. This integration was not merely one-sided; it involved a dynamic exchange where traditional Chinese medical knowledge was also conveyed to the West, influencing Western medical practices.

Macau’s strategic location allowed it to serve as a gateway for Western medical practitioners and knowledge into China. This facilitated the establishment of medical missions and hospitals, which became centers for medical education and practice. The success of these institutions in Macau set a precedent for similar establishments in mainland China, thereby broadening the impact of Western medicine. The role of key figures, such as Melchior Carneiro and Benjamin Hobson, highlights the importance of individual contributions in this process. Their efforts in establishing hospitals and translating medical texts were instrumental in ensuring the sustainability and spread of Western medical practices.

The implications of this historical exchange are profound, as they laid the groundwork for modern medical practices in China. The early acceptance and adaptation of Western medical techniques, such as vaccination and surgical procedures, have had a lasting impact on public health in China. Moreover, the intercultural exchange facilitated by Macau has contributed to a more integrated global medical knowledge base, benefiting both Eastern and Western medical practices. Macau’s unique position allowed it to be a melting pot of medical knowledge, where Western techniques were adapted to local needs and conditions.

Furthermore, the dissemination of Western medical knowledge through the translation of medical texts had a significant educational impact. The translated texts not only provided practical medical knowledge but also introduced new scientific methodologies and perspectives to Chinese scholars and practitioners. This contributed to the modernization of Chinese medical education and practice, fostering a more scientific approach to medicine that emphasized empirical evidence and systematic research. Overall, Macau's role in the eastward spread of Western medicine exemplifies the importance of cultural and intellectual exchange in advancing medical knowledge and practices.

## Conclusion

This study highlights the significant role of Macau in the eastward spread of Western medicine, serving as the initial point of entry for Western medical practitioners and knowledge into China. The establishment of Western medical institutions in Macau and the subsequent dissemination of medical knowledge and practices were pivotal in shaping the healthcare landscape of China. The profound impact of this cultural and medical exchange is evident in the integration of Western medical techniques and pharmaceuticals into Chinese practices. Macau's strategic location and its status as a cultural crossroads facilitated the introduction and acceptance of Western medicine in China. The efforts of Western medical missionaries in translating and compiling medical texts not only ensured the continuity of medical knowledge but also fostered a deeper understanding and integration of different medical traditions.

The findings of this study underscore the importance of Macau as a critical node in the network of medical and cultural exchanges between the East and the West. Macau was not just a passive recipient of Western medical knowledge but an active participant in its dissemination and adaptation. The city's medical institutions and practitioners played a crucial role in bridging the gap between Western and Chinese medical traditions, leading to significant advancements in medical practices and public health in China.

Understanding the historical context and the role of key figures and institutions in this process provides valuable insights into the dynamics of cultural and intellectual exchanges that continue to influence global medical practices today. The legacy of this exchange continues to be felt in modern medical practices and healthcare systems of both regions.

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