

Review

Core issues in the construction and implementation of synergistic Chinese-Western medicine clinical treatment strategies

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Abstract

The demand for Chinese-Western medicine collaboration has grown significantly, but current integration methods have substantial limitations. This article analyzes core issues in developing and implementing synergistic Chinese-Western medicine clinical treatment strategies and explores the transformation from traditional integration to genuine synergistic models. We analyzed methodological obstacles in synergistic strategy development through literature review and theoretical analysis, and explored applications of intelligent technology in strategy development. Four core challenges were identified: (1) Treatment timing coordination difficulties caused by different decision-making approaches, with Chinese medicine using syndrome-based assessments and Western medicine relying on standardized measurements; (2) Treatment selection complexities when integrating different types of evidence, lacking frameworks for evaluating and combining diverse evidence sources; (3) Obstacles in incorporating patient preferences systematically, with inadequate assessment methods and unclear integration mechanisms; (4) Implementation barriers in translating synergistic strategies into clinical practice, requiring changes in organizational structures, workflows, and evaluation systems. Large language models (LLMs) and other intelligent technologies offer technical support for addressing these methodological challenges. This article examines current challenges in developing synergistic Chinese-Western medicine clinical strategies, analyzing the shift from traditional integration toward synergistic approaches and identifying four core methodological obstacles. Exploring intelligent technology applications provides insights to inform future research directions and clinical practice development in integrated healthcare delivery.

Keywords: Integrative Chinese-Western medicine, Evidence synthesis, Clinical coordination, Practice implementation

1 Introduction

The integration of Chinese and Western medicine has evolved significantly over several decades, moving from simple combination approaches toward more collaborative models^[1]. However, most current integration strategies are limited to adding techniques from one system to the other, rather than creating unified methodologies or systematic frameworks^[2]. This superficial approach stems from the

fundamental differences between Chinese medicine's holistic, pattern-based perspective and Western medicine's reductionist, disease-focused framework, which create barriers to unified clinical decision-making and outcome evaluation^[3]. Consequently, clinical practice often results in parallel treatment instead of true integration, limiting the potential benefits of combining both systems and highlighting the need for genuinely synergistic models.

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The demand for effective integration is growing. Increased global interest, spurred by initiatives like the World Health Organization (WHO) traditional medicine strategies^[4,5], has led to advances in both theory and clinical practice^[2,6]. Concurrently, significant national policies supporting the revitalization of Chinese medicine^[7] and the establishment of multidisciplinary care models have created favorable conditions for deeper integration^[8]. Despite these opportunities, the development process from theoretical construction to clinical implementation reveals critical shortcomings. Current approaches suffer from incomplete methodological frameworks, underdeveloped standardized pathways, and unresolved implementation barriers. Healthcare institutions and medical professionals vary significantly in their understanding and application of synergy, resulting in inconsistent clinical outcomes. These issues represent the primary obstacles to advancing Chinese-Western medicine integration.

This article aims to identify and analyze core methodological challenges in developing synergistic Chinese-Western medicine clinical strategies, with the primary objective of providing a theoretical framework that informs the transformation from traditional integration approaches to genuine synergistic models for improved clinical decision-making and patient outcomes.

2 From Integration to Synergy: Paradigm Evolution in Chinese-Western Medical Cooperation

Chinese-Western integrated medical practice has reached a critical point. Analysis of 231 clinical guidelines published between 2010–2020 shows rapid quantitative growth, with annual outputs increasing from single digits to 58 guidelines in 2020^[9]. This rapid growth initially appeared to follow a pattern of incremental knowledge accumulation through technical refinement and empirical expansion^[10]. However, this expansion has not led to corresponding improvements in integration quality.

Current integration models add Chinese medicine interventions to Western medical strategies without creating unified approaches. ZHOU *et al.* analysis found that only 13.85% of guidelines established interdisciplinary development teams, 22.51% conducted systematic literature searches, and 50.42% specified evidence grading standards^[9]. Most guidelines rely on expert consensus rather than systematic evidence synthesis^[11]. This pattern differs markedly from Western medicine, where evidence-based guidelines predominate and consensus documents appear only in fields with limited evidence^[12]. The heavy

reliance on expert consensus in integrative medicine stems from a fundamental challenge: 66.23% of guidelines incorporate evidence types including classical Chinese medicine texts and clinical experience, but existing evidence grading systems cannot effectively evaluate these qualitative sources^[9]. Traditional evidence-based medicine frameworks were designed for single medical systems and have difficulty handling the diverse evidence types found in Chinese-Western medicine integration. This forces researchers to use expert consensus as a default approach.

Implementation problems compound these methodological issues. Despite 92.90% of guidelines adopting combined Chinese-Western disease nomenclature and 96.43% using syndrome-disease diagnostic frameworks^[13], actual clinical implementation often results in parallel treatment rather than true integration. Evaluation studies show that 90.91% of guidelines have poor implementation quality, with only 32.47% meeting basic executability standards and merely 5.19% achieving clear identifiability requirements^[14,15]. This implementation gap appears to be linked to the guidelines' design, as recommendations may not provide sufficient actionable detail for clinical execution and are often not formatted to facilitate easy identification. Clinicians frequently receive two sets of independent, potentially conflicting recommendations rather than unified guidance.

The convergence of these anomalies indicates that traditional integration models have reached their performance boundaries. The assumption that technical combination can achieve meaningful synergy between medical systems has proven inadequate. Medical knowledge includes not only explicit technical information but also cognitive frameworks, value systems, and practice traditions. When medical systems with different philosophical foundations attempt integration, surface-level technical compatibility masks deeper conflicts that current models cannot address. Advancement requires new approaches that can manage different types of evidence, support diverse knowledge integration, and adapt to complex implementation environments. This represents a shift from simple technical combination to synergy, from static strategy development to dynamic processes, and from one-way knowledge transfer to multidimensional integration (Figure 1). Genuine synergy is characterized by emergent benefits exceeding mere additive effects, identifiable through measurable improvements in patient outcomes (such as superior remission rates, reduced adverse events, or enhanced quality of life) that surpass results from either system alone.

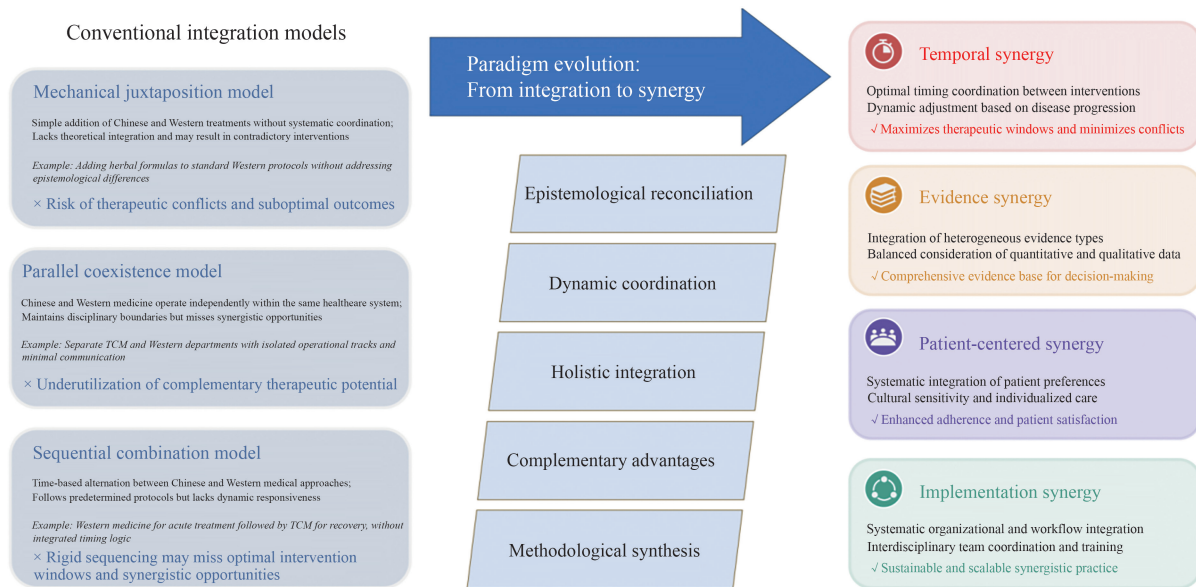


Figure 1 Paradigm evolution of Chinese-Western medicine integration: From conventional models to synergistic frameworks.

3 Core Challenges in Synergistic Strategy Development

Achieving meaningful transformation from conventional integration toward genuine synergistic models requires identifying and addressing core technical challenges in the development process. Our comprehensive analysis of current practices and theoretical frameworks reveals four interconnected critical issues: synergistic timing identification complicated by cognitive framework disparities, therapeutic strategy selection challenges amid heterogeneous evidence integration, systematic obstacles in incorporating patient preferences scientifically, and implementation barriers in translating synergistic strategies from theory to practice (Figure 2).

3.1 Cognitive Framework Disparities and Synergistic Timing Challenges

Chinese medicine and Western medicine use different approaches to determine treatment timing, creating significant challenges for synergistic strategies. Western medicine typically determines treatment timing based on measurable parameters like laboratory values, imaging results, and standardized assessment scores. Chinese medicine relies more on pattern recognition through clinical manifestations such as tongue appearance, pulse characteristics, and symptom combinations that indicate syndrome changes^[16]. These different approaches make it difficult to coordinate treatment decisions between the two systems. In diabetes management, Western medicine uses standardized staging based on quantified parameters such

as glycated hemoglobin and insulin resistance indices to guide treatment decisions^[17]. Chinese medicine develops treatment strategies according to syndrome patterns, including Qi-Yin deficiency, kidney yang insufficiency, and damp-heat accumulation, which may change independently of laboratory values^[18,19]. This creates situations where the two systems may recommend different treatment intensities at the same time point. In stroke treatment, Western medicine follows systematic protocols: Verify onset time, exclude hemorrhage through computed tomography (CT), assess reperfusion therapy indications, and initiate treatment within specific time windows^[20]. Chinese medicine practitioners adjust treatments based on ongoing changes in tongue and pulse manifestations. They may intensify blood-activating treatments when observing deepened tongue purpleness, or enhance phlegm-resolving techniques when signs of phlegm obstruction worsen^[21]. These adjustments may occur when Western medicine considers the patient stable and not requiring treatment changes.

The scope of intervention timing also differs. Chinese medicine's emphasis on early intervention and prevention creates broader treatment windows compared to Western medicine's focus on specific disease phases. In rheumatoid arthritis, Western medicine categorizes disease activity using standardized indicators such as DAS28 scores and adjusts immunosuppressive therapy accordingly^[22,23]. Chinese medicine practitioners may modify treatments based on subtle changes in tongue coating or pulse quality that suggesting syndrome evolution, even when



Figure 2 Chinese-Western medicine synergy core challenges and potential application of large language models.

joint symptoms and laboratory markers remain stable^[24]. In coronary heart disease prevention, Western medicine clearly defines primary, secondary, and tertiary prevention stages corresponding to specific risk populations^[25]. Chinese medicine may begin interventions when patients show signs of phlegm-dampness constitution or emotional imbalance, creating continuous treatment approaches throughout the disease course. For stable coronary heart disease, Chinese medicine practitioners may strengthen blood-activating treatments based on tongue and pulse characteristics that suggest worsening blood stasis^[26,27], while Western medicine requires objective evidence such as positive stress tests or angiographic progression before adjusting therapy.

Current integration practices attempt three coordination approaches, but each has limitations^[28]. Western medicine-dominated models treat Chinese medicine as supplementary, limiting its role in timing decisions. Parallel approaches maintain separate decision-making processes but lack coordination. Sequential models combine treatments in predetermined orders without addressing the underlying timing conflicts. Resolving these challenges

necessitates moving beyond these simple models toward developing novel coordination mechanisms. However, the concept of synergistic timing is, at present, more of a theoretical proposal than a validated clinical tool. Its future potential would depend on the development and testing of new frameworks, such as creating reference systems that map syndrome evolution patterns to disease progression stages^[29], and establishing decision protocols that integrate both objective measurements and syndrome-based assessments for optimal treatment synergy^[30].

3.2 Evidence Synthesis and Strategy Selection Complexities

Chinese-Western medicine synergy aims to provide patients with optimized therapeutic approaches that surpass single-system capabilities. However, identifying effective therapeutic combinations faces significant challenges due to different evidence systems. Western medicine prioritizes objective changes in specific biomarkers and standardized assessments, emphasizing measurable, reproducible quantitative evidence. Chinese medicine emphasizes holistic regulation and functional improvements, prioritizing subjective experiences and

overall well-being. Depression treatment illustrates this difference: Western medicine focuses on neurotransmitter dysfunction correction and Hamilton Depression Rating Scale improvements^[31,32], while Chinese medicine prioritizes overall state restoration including Qi regulation and mental tranquility, improvements often not captured by standardized instruments. This creates situations where therapeutic effects may be well-validated within one system while remaining difficult to recognize within another.

Synthesizing evidence for Chinese medicine therefore requires a nuanced approach. While contemporary clinical trials are fundamental for establishing efficacy and safety according to modern standards, the evidence base for Chinese medicine also includes distinctive components beyond contemporary research, such as classical textual documentation and accumulated clinical experience. Integrating these different evidence types while maintaining modern evaluation standards and preserving Chinese medicine characteristics represents a significant methodological challenge. Current research capacity cannot comprehensively evaluate all possible intervention combinations. Even when focusing on limited therapeutic options, conventional randomized controlled trial methodologies face substantial constraints when assessing Chinese-Western medicine synergy: Multiple intervention combinations complicate trial design and increase sample size requirements^[33], strict recruitment criteria create differences from real-world populations, limiting evidence applicability^[34], individualized characteristics of Chinese medicine interventions make many clinical practices difficult to replicate within standardized trial frameworks.

Understanding the value of Chinese-Western medicine synergy presents another critical challenge. Combined applications may generate different types of benefits through complex relationships, including enhanced efficacy, improved safety profiles, better economic outcomes, and superior patient experiences. In non-small cell lung cancer treatment, Chinese herbal medicine may demonstrate direct antitumor activity, enhanced radiotherapy sensitivity, and reduced radiation-induced injury^[35], while clinical practice shows synergistic value through improved long-term outcomes and enhanced quality of life^[36]. Such multidimensional benefits make traditional single-endpoint evaluation methods inadequate.

Addressing these challenges requires leveraging clinical experience to identify specific synergistic approaches through literature reviews and expert consultations. Evidence integration should accommodate Chinese medicine characteristics through evaluation methods compatible with

diverse evidence types, creating comprehensive evidence chains that include clinical efficacy, theoretical foundations, and mechanistic understanding^[37,38]. Establishing evidence quality assessment systems adapted to Chinese-Western medicine characteristics enables scientific evaluation of different evidence types' reliability and applicability. Therefore, a comprehensive assessment of synergistic value must extend beyond efficacy to rigorously evaluate safety. This requires explicitly accounting for risks unique to combination therapy, such as antagonistic interactions or unforeseen adverse events arising from cross-modality interference. Only by weighing therapeutic gains against these potential harms can the true net clinical benefit be determined, providing a robust evidence base for selection decisions.

3.3 Challenges in Patient Preference Integration

Scientific integration of patient preferences is essential for implementing patient-centered care principles. Patients show significant individual differences in their understanding, attitudes, and expectations regarding different medical approaches, directly influencing treatment acceptance and clinical outcomes^[39]. Scientific patient preference integration represents both an ethical requirement respecting patient autonomy and an essential pathway for optimizing medical decision-making and improving clinical effectiveness. In Chinese-Western medicine synergistic contexts, differences between medical systems create additional decision-making complexity, highlighting the importance of patient preference integration.

Scientific patient preference integration faces multiple challenges. The primary obstacle is the lack of standardized assessment methods, with current evaluations predominantly relying on unstructured verbal inquiries or physician subjective judgments, inadequately reflecting patients' authentic preferences^[40]. Most assessments use static, one-time approaches, failing to capture preference changes throughout disease progression and treatment experiences^[41]. Second, preference integration decision-making mechanisms remain unclear, with undefined timing and weighting leading to extremes of complete neglect or excessive accommodation, lacking transparency and consistency. Within Chinese-Western medicine contexts, patients may appreciate Chinese medicine's holistic approach while having concerns about herbal medicine's bitter taste and preparation inconvenience^[42], or value Western medicine's rapid effectiveness while worrying about adverse effects and long-term dependency. Existing mechanisms provide insufficient guidance for balancing these complex, sometimes contradictory preferences within synergistic

strategies^[43]. Furthermore, there is a lack of mature frameworks for navigating the ethical tension between evidence-based recommendations and patient autonomy. A crucial principle is that the prioritization of patient autonomy should be inversely proportional to the certainty and magnitude of the expected clinical benefit. In scenarios with high-certainty evidence for a life-saving or function-preserving treatment, the physician's primary duty is to persuasively communicate this rationale to facilitate truly informed consent, rather than framing disparate options as equally valid. Conversely, in situations of clinical equipoise, or when choosing among therapies with similar efficacy profiles that primarily affect quality of life, patient values must become the decisive factor^[44].

Resolving these challenges requires constructing systematic patient preference integration frameworks, with patient decision aids serving as core support mechanisms^[45]. Addressing standardized preference assessment deficiencies involves developing structured Chinese-Western medicine treatment preference assessment tools that systematically evaluate patient preferences across treatment objectives, risk tolerance, and intervention modalities through scenario-based questions. Establishing dynamic assessment mechanisms through periodic preference re-evaluation across different disease phases captures preference evolution, ensuring continuous treatment-patient need alignment. Addressing unclear preference integration mechanisms involves exploring stratified preference integration strategies, prioritizing medical evidence in essential treatments while fully incorporating patient preferences in optional treatments. Key preference-sensitive decision points within therapeutic strategies should offer multiple options, enabling flexible adjustments based on patient preferences. Addressing insufficient preference-evidence balance involves establishing synergistic mechanisms through Chinese-Western medicine treatment comparison tools that present different approaches' principles, expected outcomes, potential risks, and evidence support levels in accessible language, facilitating informed patient choices^[46]. Digital technologies enable web-based decision aid tools to enhance preference assessment convenience and coverage, but their implementation is contingent on addressing the ethical stewardship of patient data to prevent potential misuse and uphold clinical trust.

3.4 Obstacles in Synergistic Strategy Implementation

Clinical implementation of Chinese-Western medicine synergistic therapeutic strategies represents the critical transition from theoretical design to practical clinical

outcomes. Implementation is more complex than traditional single medical system approaches and must overcome organizational, workflow, and evaluation system barriers while developing healthcare professionals' interdisciplinary competencies.

Traditional healthcare institutions operate through discipline-based organizational structures that inadequately support Chinese-Western medicine integration requirements. Department-separated management models create isolated operational tracks for Chinese medicine and Western medicine activities, limiting synergy to superficial consultations or sequential treatments^[47]. Addressing this challenge requires integrated care team models that break professional barriers to construct disease-centered synergistic units^[48]. Within this framework, Chinese-Western medicine team members work together around shared patient populations with clearly defined responsibilities and decision-making processes, establishing comprehensive synergistic mechanisms from admission assessment through discharge follow-up. For example, combining Chinese medicine's syndrome differentiation approach with Western medicine's multidisciplinary consultation advantages enables dual-track assessment and decision-making mechanisms: patients undergo joint initial evaluations by Chinese medicine and Western medicine physicians to develop preliminary therapeutic approaches, while critical treatment nodes use combined rounds and case discussions to adjust treatment plans through integrated perspectives from both medical systems^[49].

Communication barriers between Chinese medicine and Western medicine practitioners represent deeper implementation challenges, including insufficient understanding and recognition of each other's medical systems, directly compromising synergistic quality^[50,51]. Addressing these barriers requires constructing systematic interdisciplinary training systems emphasizing mutual theoretical learning, clinical skill exchange, and synergistic competency enhancement to develop professionals with integrative thinking capabilities. Supportive organizational cultures and incentive mechanisms should incorporate Chinese-Western medicine synergy into medical quality evaluation and professional development systems through performance assessments and advancement pathways, encouraging healthcare professionals' synergistic engagement^[52]. Regular Chinese-Western medicine synergistic case discussions and experience-sharing activities promote mutual understanding and professional recognition among practitioners from different backgrounds.

4 Innovative Applications of Intelligent Technology in Synergistic Strategy Construction

Large language models (LLMs) have become widely adopted artificial intelligence (AI) techniques in evidence-based medicine research. Their knowledge extraction and integration capabilities offer opportunities to address complex challenges in developing synergistic Chinese-Western medicine clinical strategies. Unlike traditional information systems, LLMs can handle large heterogeneous datasets and help bridge the gap between Chinese and Western medicine, offering a new technological paradigm for synergistic strategy development (Figure 2).

In systematic reviews of Chinese-Western medicine collaboration, large language models show potential across critical stages including evidence retrieval, screening, data extraction, and risk of bias assessment. Recent studies demonstrate that LLMs can achieve comparable or superior accuracy to traditional manual approaches while substantially improving efficiency^[53–55]. Evidence retrieval for Chinese-Western medicine synergy typically involves complex search terms and multilingual databases. LLMs can assist researchers in developing comprehensive search strategies while maintaining consistency across different languages and database structures^[56,57]. For literature screening, LLMs can rapidly identify relevant studies based on predefined inclusion and exclusion criteria, showing good performance in recognizing complex intervention descriptions, multiple outcome measures, and cross-cultural study designs commonly found in Chinese-Western medicine research, thereby enhancing the efficiency and consistency of large-scale literature screening^[58]. For data extraction, these models can identify and extract key information including study design, participant characteristics, interventions, and outcome measures, with particular strength in recognizing Traditional Chinese Medicine-specific data such as syndrome differentiation, herbal formula compositions, and therapeutic principles, effectively transforming unstructured clinical descriptions into standardized data formats^[59]. In risk of bias assessment, LLMs can systematically evaluate study quality using established assessment tools, identifying critical methodological elements such as randomization methods, allocation concealment, and blinding implementation, while providing quality assessment frameworks for methodological challenges unique to Chinese-Western medicine synergy, including individualized treatments, complex interventions, and multiple outcome measurements^[60,61]. The challenge

in Chinese-Western medicine evidence evaluation lies in simultaneously processing standardized evidence from modern medicine and experiential knowledge from traditional medicine. LLM-assisted approaches can reduce the professional knowledge barriers and resource requirements for cross-disciplinary evidence synthesis, providing more comprehensive evidence support for clinical decision-making^[62].

LLMs can adapt information presentation based on patients' cultural backgrounds, educational levels, and health literacy, reducing communication barriers between healthcare providers and patients caused by complex terminology and knowledge differences, thereby enhancing patient understanding and optimizing the collection of patient preferences^[63]. To address cross-disciplinary barriers in clinical implementation, large language models can construct concept mapping and knowledge graphs across medical systems^[64,65], providing support for physicians from diverse professional backgrounds. LLMs can analyze terminology, concepts, and relationships between Chinese and Western medicine to establish unified knowledge frameworks, helping researchers understand medical concepts while overcoming comprehension barriers caused by semantic differences and cultural factors^[66].

These models show good performance in identifying different medical expressions describing identical pathological phenomena^[67], facilitating mapping between Chinese and Western medicine concepts. Additionally, using clinical practice guidelines, retrieval-augmented generation frameworks enable the construction of evidence-based decision support systems that transform traditional guideline reading into interactive question-answer formats, enhancing multidisciplinary team efficiency and decision-making quality^[68]. However, a critical appraisal is essential. The models' inherent propensity for factual inaccuracies and limited reliability in specialized domains, coupled with their operational opacity, impede independent verification. These challenges necessitate a human-in-the-loop validation framework, positioning the technology as a powerful assistive tool rather than an autonomous agent.

5 Conclusions

The development of synergistic Chinese-Western medicine clinical treatment strategies has become increasingly important as healthcare systems recognize the limitations of simple combination approaches. Current integration models, which predominantly add Chinese medicine interventions to Western medical strategies, have

proven insufficient to realize the complementary potential of both medical systems.

This article examined four major challenges in developing synergistic strategies. Treatment timing coordination difficulties arise from different decision-making approaches between Chinese medicine's syndrome-based assessments and Western medicine's standardized measurements. Evidence synthesis complexities stem from the need to integrate different evidence types while maintaining scientific rigor and cultural authenticity. Patient preference integration faces obstacles in structured assessment and dynamic mechanisms that can accommodate cross-cultural medical choices. Implementation barriers require organizational restructuring, interdisciplinary competency development, and systematic workflow optimization to support genuine synergistic practice. These challenges demonstrate that meaningful advancement requires systematic methodological improvements rather than continued reliance on superficial combination strategies. Addressing the timing coordination challenge requires developing coordination mechanisms that preserve both frameworks while enabling unified clinical decision-making. Evidence synthesis complexities demand methodological approaches that can handle diverse evidence types effectively. Patient preference integration needs structured assessment tools and dynamic mechanisms. Implementation barriers must be overcome through comprehensive organizational and workflow changes.

The emergence of intelligent technologies, particularly large language models, offers opportunities to address these methodological challenges. These technologies can enhance evidence synthesis, support cross-disciplinary knowledge mapping, and facilitate decision support system development. Such technological innovations provide technical foundations for bridging knowledge gaps while maintaining the integrity of both medical traditions.

Achieving authentic Chinese-Western medicine synergy requires sustained commitment to methodological innovation, interdisciplinary collaboration, and systematic implementation strategies. Progress in this area will contribute to advancing integrative medicine practice and healthcare delivery systems capable of addressing the complex nature of human health and disease.

Ethical Approval

Not applicable.

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Declaration of Competing Interest

The authors declare that there is no conflict of interest.

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