



Opinion

Hepatitis Prevention and Control in Thailand: Current Challenges and Strategic Insights from China's Experience



Yana Zhou^{1#}, Suparata Kiartivich^{2#}, Ye Zhao², Jingjing Yang³, Qi Hao¹, Zixin Shu¹, Shujie Song¹, Xiaodong Li^{1*} and Suthat Chottanapund^{4*}

¹Hubei Provincial Hospital of Traditional Chinese Medicine (Affiliated Hospital of Hubei University of Chinese Medicine), Wuhan, Hubei, China; ²Department of Medical and Nursing Science, International College, Krirk University, Bangkok, Thailand; ³Hubei University of Chinese Medicine, Wuhan, Hubei, China; ⁴Department of Disease Control, Ministry of Public Health, Mueang Nonthaburi, Nonthaburi, Thailand

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Viral hepatitis remains a major public health challenge in Thailand and the broader Southeast Asian region, primarily driven by hepatitis B virus (HBV) and hepatitis C virus (HCV) infections, which frequently progress to cirrhosis and hepatocellular carcinoma (HCC).¹ This opinion examines Thailand as a representative case to analyze the current status and challenges of hepatitis prevention and control in the region. Drawing on practical experiences from China, it proposes targeted strategies and discusses future directions for disease control.

Thailand has nearly eliminated mother-to-child transmission of HBV.² According to data from a 32-year longitudinal study (1992–2024) monitoring the impact of the National Expanded Program on Immunization (EPI), HBsAg carriers are predominantly individuals born before the national vaccination program's inception. Based on a 2024 national cross-sectional serological survey using multi-stage random sampling, prevalence rates vary significantly by age: 0.3% in the 21–30 age group, 4.3% in those over 60, and 1.7% across the general population.² HCV infection predominantly affects middle-aged and elderly individuals. Comparative national surveys conducted over a 20-year cycle (2004, 2014, and 2024) reveal prevalence rates of 2% in the 41–50 age group and 1% in the general population. However, only approximately 25% of infected individuals are diagnosed, and merely 1% initiate treatment annually.³ The persistent burden of viral hepatitis is paralleled by a high incidence of HCC. Furthermore, based on model-based estimations from the 2022 IARC GLOBOCAN database, Thailand reported 27,936 new HCC cases (15.2% of all new cancers) and 27,143 HCC-related deaths (22.8% of all cancer deaths) in 2022, with HBV and HCV being the principal viral etiologies.⁴

Thailand's strategy has evolved from "blocking transmission" toward "eliminating harm", supported by the development of a multi-tiered system.

According to historical records from the national blood safety registry, HBsAg screening for blood donors was initiated in 1984, followed by anti-HCV serological screening in 1991.⁵ To shorten the window period, a retrospective evaluation of screening efficacy led to the introduction of nucleic acid testing in 2006 and its extension to individual donor testing by 2016.^{1,6} Since 2023, HBV and HCV screening have been integrated into the Universal Health Coverage system, providing one-time, lifelong free HBsAg and anti-HCV screening for individuals born before 1992. Primary care facilities utilize rapid diagnostic tests for initial screening, with positive cases referred for confirmatory testing and stratified assessment.⁷

The hepatitis B vaccine was incorporated into the National EPI in 1992, administered alongside hepatitis B immunoglobulin. Evaluation of national pediatric cohorts through a 22-year implementation monitoring study indicates that this strategy has reduced the hepatitis B carrier rate among children under 10 to below 0.1%.^{2,8} Although no preventive vaccine exists for HCV, curative management is now the primary focus.⁹

The National Health Security Office includes direct-acting antivirals in the national health insurance scheme, reducing the financial burden on patients. National surveys indicate a decline in the HBsAg carrier rate from 1.4% in 2004 to 0.4% in 2014,⁸ and a decrease in the HCV infection rate from 2.15% to 0.94% during the same period.⁹

Despite these strategic advancements, significant challenges hinder the full realization of these policies. First, although community-based screening at the primary care level is feasible, access to confirmatory nucleic acid testing in remote areas remains constrained by prohibitive costs and cumbersome referral pathways. These structural barriers, compounded by limited public health literacy, lead to substantial patient attrition during the transition from diagnosis to treatment initiation.³

Second, current guidelines from the Thai Association for the Study of the Liver largely recommend standardized antiviral protocols. For HBV, while prolonged viral suppression (DNA undetectability) is frequently achieved, a functional cure remains elusive.^{10,11} Regarding HCV, approximately 5–6% of patients fail to

*Correspondence to: Xiaodong Li, Hubei Provincial Hospital of Traditional Chinese Medicine (Affiliated Hospital of Hubei University of Chinese Medicine), Wuhan, China. ORCID: <https://orcid.org/0000-0002-6406-9416>. Tel: +86-13908658127, E-mail: lixiaodong555@126.com; Suthat Chottanapund, Department of Disease Control, Ministry of Public Health, 88/21 Moo 4, Tiwanon 14, Tiwanon Rd., Mueang Nonthaburi, Nonthaburi 11000, Thailand. ORCID: <https://orcid.org/0000-0001-6630-4339>. Tel: +66-86-300-6645, E-mail: suthat_97@yahoo.com

[#]These authors contributed equally to this work.

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achieve a sustained virologic response, necessitating complex and costly retreatment strategies.⁹

Lastly, evidence suggests that despite universal screening for pregnant women, the execution of downstream interventions remains inadequate. Specifically, there is a notable gap in providing antiviral therapy for mothers with high viremia and ensuring post-vaccination serological testing for infants. This fragmented care continuum results in significant patient drop-off during long-term management.¹²

China has developed a relatively systematic governance approach for the prevention and control of hepatitis and liver cancer, achieving notable success in reducing new infections and improving early diagnosis and treatment rates. First, it has implemented comprehensive immunization and screening. The vaccination rate for three doses of the hepatitis B vaccine is 99.6%, and the timely first-dose vaccination rate is 95.6%.¹³ Relying on county-level medical communities, it conducts free screening in remote areas and follows up positive cases in a stratified and regular manner.¹⁴ National policy, disease-burden evidence, and economic analyses support the targeted expansion of prevention and screening coverage.^{15–17} Second, it ensures a combination of traditional Chinese and Western medicine. The expert consensus on the prevention and treatment of chronic hepatitis incorporates traditional Chinese medicine (TCM) treatment plans.¹⁸ The adjunctive use of evidence-based Chinese patent medicines alongside antiviral therapy can increase the proportion of fibrosis regression,¹⁹ reduce the risk of HCC,²⁰ and prolong overall survival in patients with liver cancer.^{21–23} Finally, it has established a closed-loop management system for chronic diseases, with stratified follow-up and early screening for liver diseases as the main components, integrating information-based decision support into primary care to improve follow-up quality and efficiency.^{24,25}

In China, the integration of TCM with conventional antiviral therapy for chronic hepatitis B has been formalized in national expert consensus statements and validated through multicenter randomized controlled trials.^{18–20} These studies demonstrate that TCM formulations exert antifibrotic, anti-inflammatory, and immunomodulatory activities, thereby promoting fibrosis regression,¹⁹ reducing the incidence of HCC,²⁰ and prolonging overall survival in patients with liver cancer.^{21–23} Furthermore, the TCM principle of “treatment in accordance with three categories of etiological factors” (consideration of climatic and seasonal conditions, environment, and individual constitution in disease treatment) provides a testable research hypothesis and supportive treatment framework.^{26,27} Building on this empirical base, we propose the following recommendations for Thailand: (1) Strengthen the construction of medical alliances and risk education. Promote the dissemination of specialized resources and teleconsultation.²⁸ Enhance early screening and identification in primary care, standardize referrals, and establish long-term management mechanisms. Moreover, hepatitis prevention and treatment education should be incorporated into performance indicators.²⁹ (2) Implement personalized diagnosis and treatment plans. Integrating TCM into Thailand’s national hepatitis strategy offers potential advantages, particularly in addressing unmet clinical needs of standard antiviral regimens. Specifically, evidence from large-scale cohorts indicates that integrative approaches may improve safety profiles by mitigating drug-related toxicity and enhance cost-effectiveness by reducing the burden of advanced liver disease.^{19,20} Thailand has a tropical monsoon climate with a long rainy season (approximately May to October), and a significant proportion of the population has a damp-heat constitution. We propose a testable, hypothesis-

driven framework informed by the TCM principle of “treatment in accordance with three categories of etiological factors”. Given Thailand’s climatic conditions and constitutional tendencies, we hypothesize that regional and seasonal constitution profiles may be associated with distinct syndrome patterns of hepatitis and liver disease. This hypothesis should be evaluated through locally grounded epidemiological studies before translation into practice recommendations (Table 1).^{30–32} In addition, the local advantages of Thai medicine should be integrated into constitution-based identification for hierarchical intervention and rehabilitation management. (3) Strengthen the chronic disease management system by using unified registration, reminders, and tracking to form a continuous care chain covering prevention, screening, diagnosis, treatment, and follow-up (Fig. 1).

Finally, in the era of artificial intelligence (AI)-assisted medical care, cross-institutional data platforms are expected to emerge. The introduction of AI may enable dynamic risk prediction and strategy iteration, thereby supporting chronic disease management and early liver disease screening.²⁴ Simultaneously, epidemiological studies characterizing constitution patterns and syndrome types among patients with hepatitis and other liver diseases in Thailand should be undertaken to build an empirical basis for evaluating integration of Thai traditional medicine with conventional medicine.

While this manuscript provides a strategic framework for hepatitis control in Thailand, several structural limitations must be noted:

- The underlying epidemiological data rely heavily on historical registries from established urban screening centers. This localized focus potentially underrepresents remote border populations, introducing selection bias that may limit nationwide applicability.
- Despite Thailand’s legal framework for TCM, integration faces practical constraints, including a shortage of locally certified practitioners trained in syndrome differentiation, a lack of standardized herbal quality control across borders, and low public awareness of integrative protocols.
- Consequently, future locally grounded clinical trials and epidemiological surveys are required to validate the safety, efficacy, and feasibility of these conceptual models before formal implementation.

In conclusion, Thailand has made substantial progress in hepatitis prevention and control through immunization, blood safety, screening, antiviral treatment access, and mother-to-child transmission prevention. Future efforts should focus on strengthening the continuum from screening and diagnosis to treatment and long-term follow-up, particularly in underserved areas. Experiences from China may provide useful strategic references; however, any integrative medicine approach, including TCM and Thai traditional medicine, should be locally validated and used only as a complementary strategy alongside guideline-recommended antiviral therapy.

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Table 1. The hypothesis framework of TCM syndrome differentiation based on “treatment in accordance with three categories of etiological factors” for different climates and regions in Thailand

	Classification	Traditional Chinese medicine syndrome	Therapeutic methods and prescriptions
Individual's constitution	Damp-heat constitution	Syndrome/pattern of dampness and heat in the liver and gallbladder; syndrome/pattern of dampness and heat in the spleen and stomach	Clearing heat and dispelling dampness, soothing the liver and fortifying the spleen (Yinchenhao Decoction, Longdan Xiegan Decoction, Huoxiang Zhengqi Powder)
Environment	The northeast, The Mekong River basin	Syndrome/pattern of warm dryness damaging the fluid (dry season); syndrome/pattern of summer heat and dampness (rainy season)	Nourishing yin and moistening dryness, clearing heat and producing fluid (Shashen Maidong Decoction); removing summer-heat and draining dampness (Huoxiang Zhengqi Powder)
Environment	Western mountains, Mountainous areas along the Thai-Myanmar border	Syndrome/pattern of cold and dampness encumbering the spleen; syndrome/pattern of wind and cold and dampness impediment	Warming the middle jiao to dissipate cold, drying dampness with pungent, aromatic herbs (Lizhong Decoction, Wutou Decoction, Ginger herbal package for external application)
Environment	Central plain, Bangkok	Syndrome/pattern of dampness and heat and toxin accumulation; syndrome/pattern of blood stasis due to liver heat	Clearing heat and removing toxin; draining dampness (Yinchenhao Decoction and Yinqiao Powder)
Climatic and seasonal conditions	Tropical hot and humid climate	Syndrome/pattern of summer-heat and dampness encumbering the spleen; syndrome/pattern of dampness and heat accumulation and steaming	Fortifying the spleen to resolve dampness, clearing summer-heat and removing toxins (Qingshu Yiqi Decoction) relieving the exterior with pungent-warm medicinals (turmeric, cinnamon leaves, and other herbs smoked outside)

This table is intended to provide a testable research hypothesis and supportive treatment options, not clinical practice guidance. Any integrative medicine approach must not replace guideline-recommended antiviral therapy and requires local validation, appropriate professional qualification, and regulatory approval. Refer to Clinic terminology of traditional Chinese medical diagnosis and treatment-Part 2: Syndromes/patterns (GB/T 16751.2-2021) and Clinic terminology of traditional Chinese medical diagnosis and treatment-Part 3: Therapeutic methods (GB/T 16751.3-2023) for the English translation of TCM syndromes and therapeutic methods.^{30,31} The prescriptions proposed in traditional Chinese medicine based on syndrome differentiation and treatment are provided as examples, referring to Internal Medicine of Traditional Chinese Medicine (11th edition).³² They are used only to illustrate the direction of TCM syndrome differentiation and treatment and are not equivalent to recommended prescriptions in Thailand. TCM, traditional Chinese medicine.

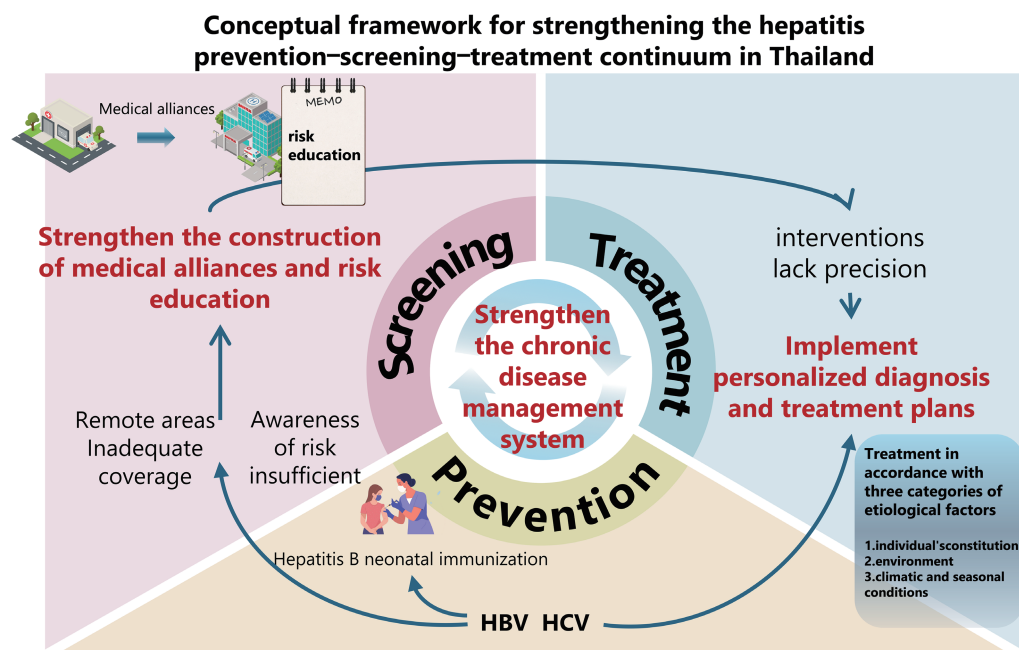


Fig. 1. Technology roadmap. The central wheel indicates a strengthened chronic disease management system linking prevention (e.g., neonatal HBV immunization and MTCT prevention), screening, and treatment. The left panel highlights implementation bottlenecks (inadequate coverage in remote areas and insufficient risk awareness) and the proposed countermeasures (medical alliances and risk education). The right panel highlights the limited precision of current interventions and proposes individualized diagnosis and supportive care, including an integrative medicine module guided by the “treatment in accordance with three categories of etiological factors” (consideration of climatic and seasonal conditions, environment, and individual constitution in disease treatment). The figure is schematic and contains no primary quantitative data. HBV, hepatitis B virus; HCV, hepatitis C virus; MTCT, mother-to-child transmission.

Conflict of interest

The authors declare no conflict of interest.

Author contributions

Study conception and design (YnZ, SK, XL, SC), literature search and analysis (YnZ, SK, YZ), drafting of the manuscript (YnZ, SK, JY, QH, ZS, SS), critical revision of the manuscript for important intellectual content, and study supervision (XL, SC). All authors read and approved the final manuscript.

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