Prevention-Treatment Integration: Healthier People and a Stronger Economy

Executive Summary

Health is essential for promoting the comprehensive development of individuals and the foundation for economic and social progress.[1] China has made notable strides in infectious disease prevention, achieving high coverage through its national immunisation programme for children. Yet, immunisation alone is insufficient to fully contain infectious diseases, which continue to threaten socio-economic development. With an ageing population, strengthening prevention has become a pressing priority. As part of the Healthy China strategy, "Prevention-Treatment Integration (PTI)" reforms that promote synergy between healthcare and disease control institutions—through vaccination, early diagnosis, and early treatment—safeguard public health, boost productivity, reduce healthcare burden, and drive long-term economic growth.

From both healthcare and economic perspectives, increasing adult vaccination rates among high-risk populations is an urgent priority. Vaccines for diseases such as shingles, influenza, and RSV are vital for older adults who face greater risks due to weakened immune systems and chronic conditions. In China, the economic burden of hospitalisation costs for older adults with RSV reached an estimated US$1.88 billion in 2023. Evidence from adult vaccination programmes across ten countries shows that prevention pays off—returning up to 19 times the initial investment through benefits to individuals, healthcare systems, and society.

On the other hand, China faces a significant challenge with 75 million people chronically infected with the Hepatitis B virus (HBV) and 30 million unaware of their condition. The economic and healthcare burden of disease progression to cirrhosis and liver cancer highlights the urgency of enhancing HBV management. Despite progress through low-cost antivirals, paediatric vaccination, and the prevention of mother-to-child transmission—reaching 99% newborn vaccination coverage by 2012—China remains far from meeting the WHO's 2030 milestone of a 90% diagnosis rate and 80% treatment rate. With less than five years to go, further innovation is urgently needed.

A functional cure for HBV, now in late-stage development, marks a potential treatment paradigm shift. Unlike lifelong antivirals, it uses a six-month treatment regimen to restore immune response and maintain long-term viral suppression. This innovation could boost screening and treatment uptake and enhance patient dignity and productivity. By complementing existing antiviral therapies, functional cure could drive progress towards the 2030 milestones.

This paper focuses on PTI in adult vaccination and HBV management, offering the following recommendations based on international experience and China's specific context to foster coordinated collaboration between prevention and treatment. It is important to bear in mind that this integrated approach is critical for controlling all infectious diseases and has broader applications for managing others, such as HIV and tuberculosis.

Policy Recommendations

For Adult Vaccination:

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1 "健康中国 2030"规划纲要. https://www.gov.cn/gongbao/content/2016/content_5133024.htm

- Incorporate adult vaccination into Healthy China and PTI priorities, formulating systematic policies and accelerating vaccine approvals.
- Utilise the network of general practitioners and family doctors to provide vaccination recommendations and prescriptions based on health risks, ensuring that high-risk groups are protected.
- Train general practitioners to help doctors effectively address patients' concerns about vaccination, disseminate scientific knowledge, and correct misunderstandings.
- Leverage digital tools to achieve information connectivity for prescriptions, points of vaccination (POV) and disease control system. Monitor vaccination rates, optimise vaccine supply and vaccination strategies.
- Establish incentive mechanisms for general practitioners and medical institutions.
- Formulate national policies and technical guidelines for setting up vaccination points, standardising operational processes, and improving supervision mechanisms.

For HBV Management:

- Embed the World Health Organization's 2030 hepatitis B diagnosis and treatment targets into medium and long-term strategies such as the upcoming 15th Five-Year Plan.
- Create a five-year action plan with phased targets and specific measures for testing, diagnosis, and treatment rates to ensure effective implementation.
- Accelerate drug approval for HBV functional cure, define functional cure as a key treatment outcome, and include functional cure in the standard treatment guidelines.
- Ensure functional cure accessibility with funding mechanisms like national reimbursement, dedicated pools for innovative drugs, and outcome-based payment models.

1.The Significance of Prevention-Treatment Integration

China has made substantial progress in managing infectious diseases over recent decades, yet the burden of these diseases and their impact on society and the economy remain significant. Amid China's rapidly evolving demographic landscape—characterised by increasing life expectancy and declining birth rates—the urgency of investing in preventive healthcare has never been greater. Prioritising vaccination, early detection, and timely treatment, underpinned by the ongoing Prevention-Treatment Integration (PTI) (医防融合) framework, will be critical to safeguarding the population's health and productivity in order to sustain economic growth and reduce long-term healthcare costs.

PTI aims to create a cohesive system that encompasses disease prevention, diagnosis, control, and treatment, through the coordinated collaboration of two pillars of China's health infrastructure: the system for clinical diagnosis and treatment, and the system for public health and disease prevention. The goal is to improve overall disease management and contribute to the development of a robust and sustainable healthcare system.

PTI has been highlighted as a priority in high-level Chinese policy directives, such as the "Report of the 20th National Congress of the Communist Party of China"[2] and the "14th Five-Year Plan for National Health".[3] President Xi has also personally highlighted the need for "more innovative mechanisms for PTI" during the deliberations of the Hubei delegation at the Third Session of the 13th National People's Congress.[4]

In October 2023, China's health authorities—including the National Disease Control and Prevention Administration and the National Health Commission—issued the "Responsibility List for Infectious Disease Prevention and Control in Medical Institutions".[5] The document mandates that medical institutions, regardless of level or type, should assume responsibilities in infectious disease prevention and control. These references underscore the strategic importance of PTI in advancing healthcare reform and infectious disease control.

1.1 Scope of Current PTI Policies

PTI has gained momentum from years of progress and high-level endorsement,

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2 习近平: 高举中国特色社会主义伟大旗帜 为全面建设社会主义现代化国家而团结奋斗—在中国共产党第二十次全国代表大会上的报告。 https://www.gov.cn/xinwen/2022-10/25/content_5721685.htm

3 中华人民共和国国民经济和社会发展第十四个五年规划和 2035 年远景目标纲要。 https://www.gov.cn/xinwen/2021-03/13/content_5592681.htm?eqid=a14468700001730f000000026480655e

4 习近平参加湖北代表团审议。 https://www.gov.cn/xinwen/2020-05/24/content_5514486.htm

5 国家疾病预防控制局。 关于印发《医疗机构传染病防控责任清单》的通知。 https://www.ndcpa.gov.cn/jbkzzx/c100012/common/content/content_1716315712592932864.html

but there is still no policy blueprint for its systematic implementation. Existing policies supporting PTI, primarily through pilot programmes, can largely be categorised into two main categories:

1.1.1 Systemic Integration for Epidemic Preparedness: Policies focus on integrating public health and clinical systems via data sharing, digital infrastructure (e.g., electronic health records), epidemic monitoring, and emergency response coordination to strengthen epidemic prevention and preparedness.

1.1.2 Integrated Prevention and Treatment Services by Healthcare Providers: Policies promote combining preventive care (e.g., vaccination, chronic disease risk management, health education) with clinical services.

This paper focuses on the latter category of policies in the context of infectious disease management.

1.2 Growing Urgency of Managing Infectious Disease

An estimated 1.3 million deaths in China each year are related to infectious diseases.[6] As demographic shifts increase the population's vulnerability to infectious diseases, there is an urgent need for stronger management and prevention strategies.

Older adults are particularly vulnerable to infectious diseases, a concern that is becoming increasingly significant in China as the population ages rapidly. By 2035, it is projected that over 400 million people will be aged 60 or older, representing over 30% of the total population. [7] Chronic conditions common among the elderly, such as diabetes and cardiovascular diseases, worsen the severity of infectious diseases and contribute to higher mortality rates. Patients with Type 2 diabetes, for example, are 84% more likely to develop shingles than those without,[8] while having both diabetes and cardiovascular disease raises the risk by an additional 16%.[9]

Respiratory syncytial virus (RSV) disproportionately affects older adults with

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6 Zhang, C., et al. (2023). Burden of infectious diseases and bacterial antimicrobial resistance in China: a systematic analysis for the global burden of disease study 2019. *The Lancet regional health. Western Pacific*, *43*, 100972. https://doi.org/10.1016/j.lanwpc.2023.100972

7 光明日报. 国家卫生健康委员会: 近十年我国老龄工作取得显著成效. https://www.gov.cn/xinwen/2022-09/21/content_5710849.htm

8 Poirrier, J. E., et al. (2022). Herpes Zoster Incidence and Burden in Adults With Type 2 Diabetes in the U.S.: A Retrospective Database Analysis. *Diabetes care*, *45*(11), 2585–2593. https://doi.org/10.2337/dc21-2053

9 Huang, C. T., et al. (2022). Association Between Diabetes Mellitus and the Risk of Herpes Zoster: A Systematic Review and Meta-analysis. *The Journal of clinical endocrinology and metabolism*, *107*(2), 586–597. https://doi.org/10.1210/clinem/dgab675

underlying conditions such as asthma, diabetes, and heart disease, with the prevalence of such comorbidities rising with age. Based on a surveillance programme for acute respiratory infections (ARI) in Beijing, over half of RSV patients above 60 have at least one underlying disease.[10] In the event of complications such as pneumonia, the in-hospital mortality rate is as high as 20.3%.[11] A study in Beijing found that 66.7% of hospitalised RSV patients and 51.3% of hospitalised influenza patients were aged 60 and above, with mortality rates of 17.6% and 7.5%, respectively.[12]

Meeting the targets in Healthy China 2030[13] demands urgent action to combat infectious diseases like tuberculosis (TB) and HIV. As of June 2024, 1,329,127 people were living with HIV.[14] China also ranks among the countries with the highest burden of TB globally, with nearly 800,000 new cases each year, ranking third in the world after India and Indonesia.[15]

The World Health Organisation's (WHO) 2030 milestones for Hepatitis B (HBV) – achieving 90% of people living with HBV diagnosed and 80% treated[16] – are now less than five years away. These ambitious targets aim to eliminate HBV as a global public health threat by reducing new infections and preventing deaths caused by progression to conditions such as liver cirrhosis and hepatocellular carcinoma. However, according to evidence from a national serological survey, China carries a significant portion of the global HBV burden, with approximately 75 million people living with chronic HBV infection in China alone. That represents over one-fourth of the estimated 290 million chronic HBV infections worldwide.[17] As of 2022, amongst those living with Chronic HBV in China, 24% were diagnosed and treatment coverage was only 6.4%.[18] Approximately 30

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10 Luo, M., et al. (2022). Comparison of infections with respiratory syncytial virus between children and adults: a multicenter surveillance from 2015 to 2019 in Beijing, China. *European journal of clinical microbiology & infectious diseases : official publication of the European Society of Clinical Microbiology*, *41*(12), 1387–1397. https://doi.org/10.1007/s10096-022-04492-7

11 Lee, N., et al. (2013). High morbidity and mortality in adults hospitalised for respiratory syncytial virus infections. Clinical infectious diseases: an official publication of the Infectious Diseases Society of America, 57(8), 1069–1077. https://doi.org/10.1093/cid/cit47

12 Zhang, Y., et al. (n 6).

13 卫生健康委员会。 健康中国行动（2019-2030 年）. https://www.gov.cn/xinwen/2019-07/15/content_5409694.htm

14 2024 年第二季度全国艾滋病性病疫情[J].中国艾滋病性病， 2024, 30(09):893

15 Wencong, He, et al. (2024). Transmission dynamics of tuberculosis in a high-burden area of China: An 8-year population-based study using whole genome sequencing. *International Journal of Infectious Diseases 25th Anniversary*, volume 147, 107210. https://doi.org/10.1016/j.ijid.2024.107210

16 World Health Organization. (2022). Global health sector strategies on, respectively, HIV, vira hepatitis and sexually transmitted infections for the period 2022-2030.

17 Hui, Zheng, et al. (2024). New progress in HBV control and the cascade of health care for people living with HBV in China: evidence from the fourth national serological survey, 2020. *The Lancet Regional health – Western Pacific*, volume 51, 101193

18 World Health Organization. (2024). Global hepatitis report 2024: action for access in low- and middle-

million people were unaware of their infection status, preventing them from diagnosis and treatment.[19]

1.3 PTI's Critical Role in Infectious Disease Management

The management of infectious diseases requires preventing initial infections, as well as halting their progression into more severe conditions and further spread. PTI is essential in supporting both aspects of this process:

1.3.1 Pre-infection, PTI underscores the critical role of vaccinations, particularly for adults, who are often under-vaccinated compared to children. Routine patient interactions allow clinicians to identify high-risk individuals, such as older adults or those with comorbidities, and recommend appropriate immunisations.
1.3.2 Post-infection, PTI enables clinicians to effectively detect infections early by utilising diagnostic tools and initiating timely treatment to prevent further disease progression and transmission.

Vaccination for adults is essential in addressing infectious diseases that are more prevalent or severe in adult and older populations. For example, vaccination against shingles significantly reduces the risk of developing the disease and its complications, such as postherpetic neuralgia.[20]

Similarly, vaccination against respiratory syncytial virus (RSV) in high-risk groups, such as older adults, prevents severe respiratory infections and reduces hospitalisations.[21] In older adults with RSV, the proportion of complications is as high as 80.4% and proportion of respiratory complications is 62.7%-71.9%.[22] 20.5%-23.7% of hospitalised patients required admission to ICU and the average length of hospital stay was 14 days, higher than that of influenza.[23] Prevention of RSV would hence relieve the burden on healthcare system and medical resources.

Once a person has acquired an infectious disease, the focus shifts to preventing its progression into severe disease and limiting its spread and ultimately changing the course of disease, even if the infection cannot be fully eliminated. This is particularly true for HBV, which carries a significant risk of progressing to chronic hepatitis, cirrhosis, and hepatocellular carcinoma (HCC)—conditions that

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income countries. ISBN: 978-92-4-009167-2
19 Hui, Zheng, et al. (n 17).
20 World Health Organisation. Shingles (herpes zoster). https://www.who.int/news-room/fact-sheets/detail/shingles-(herpes-zoster)
*Postherpetic neuralgia is a long-term nerve pain and a complication of shingles *(US CDC)*
21 Du, Z., et al. (2025). Impact of RSVpreF vaccination on reducing the burden of respiratory syncytial virus in infants and older adults. *Nat Med 31*, 647–652. https://doi.org/10.1038/s41591-024-03431-7
22 Lee, N., et al. (n 11).
Zhang, Y., et al. (n 6).
23 Lee, N., et al. (n 11).

contribute to high rates of morbidity and mortality. Chronic HBV infection is the leading cause of liver cirrhosis and HCC, with 71% of liver cirrhosis cases and 84%-92% of HCC cases attributed to HBV.[24] Moreover, liver cancer is the fourth most common malignant tumour in China and the second leading cause of cancer-related deaths, with the five-year survival rate only at 10%-14%.[25] Therfore, early diagnosis and timely medical intervention by clinicians are critical for controlling disease severity and improving outcomes.

1.4 Economic Implications

Adult vaccination and the elimination of HBV represent critical opportunities to significantly reduce the economic burden of infectious diseases on individuals, healthcare systems, and society as a whole.

A study examining adult immunisation programmes across ten countries and four vaccines demonstrated that adult vaccination programmes can return up to 19 times their initial investment through benefits to individuals, the healthcare system, and wider society.[26] Adult vaccination programmes reduce healthcare costs and boost societal productivity by promoting health, economic activity, and easing caregiving burdens.

1.4.1 The use of vaccines to prevent diseases in adults and the elderly results in fewer medical visits, diagnostic tests, treatments, and hospitalisations, all of which contribute to substantial savings in healthcare costs.[27]

1.4.2 Vaccination improves societal productivity, as healthier populations contribute more to tax revenue, remain active in the workforce, and continue contributing to pensions. Additionally, it allows individuals to allocate financial resources to other priorities while reducing the caregiving burden on families and

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24 戴二黑， 郭心如， 王继涛等。 肝硬化的病因及防治现状调查 [J] 。 中华医学杂志， 2023， 103(12) 。 913-919. DOI: 10.3760/cma.j.cn112137-20221017-02164

Lin, J., et al. (2022). Epidemiological Characteristics of Primary Liver Cancer in Mainland China From 2003 to 2020: A Representative Multicenter Study. *Frontiers in oncology,12*, 906778. https://doi.org/10.3389/fonc.2022.906778

中国研究型医院学会微创外科学专委会(2021)。 乙型病毒性肝炎相关肝细胞癌围手术期抗病毒治疗规范。 14(3), 129-136. https://www.lcgdbzz.org/custom/news/id/48a1cc8d-9099-4501-b62f-5a5285081b61

25 Hepatitis B Foundation. Survival Rates. https://www.hepb.org/research-and-programs/liver/staging-of-liver-cancer/survival-rates/

26 El Banhawi H (2024). The Socioeconomic Value of Adult Immunisation Programmes. OHE Contract Research Report: Office of Health Economics. https://www.ohe.org/publications/the-socio-economic-value-of-adult-immunisation-programmes/

OHE evaluate the value through assessing the impact on quality of life of vaccinated; impact on mortality of vaccinated; transmission value; cost offset to healthcare system; impact on productivity of vaccinated; impact on carer productivity of vaccinated; impact on carer productivity; social equity value; AMR prevention value and macroeconomic effects.

27 Largeron, N., et al. (2015). Role of vaccination in the sustainability of healthcare systems. *Journal of Market Access & Health Policy, 3*(1), 27043. https://doi.org/10.3402/jmahp.v3.27043

support networks.

1.4.3 As an example of adult vaccination, the total economic burden of hospitalisation costs in China among older adults with RSV was estimated at US$1,882.8 million in 2023.[28] A figure comprised of an estimated 625,655 RSV-associated hospitalisations among older adults in China in 2023 with a hospitalisation cost of about US$3,009 per person.

The 2030 HBV elimination milestones also implicate significant healthcare saving and productivity improvement for China. Accounting for medical costs, lost labour pay, and other costs related to diminished quality of life, chronic HBV-related diseases impose a substantial economic burden,[29] with the annual per capita cost estimated at RMB 92,978.34 in China. Primary hepatocellular carcinoma (PHC) and severe hepatitis B result in the highest burdens at RMB 166,462.68 and RMB 116,933.30, respectively.[30] Additionally, a study in Fujian province has found that 65.45% of HBV cases were individuals aged between 20 to 50 years old – representing a population in their key years of greatest economic productivity.[31] HBV elimination efforts would alleviate financial strain on the healthcare system and improve the social and economic participation of individuals living with HBV.

The following sections analyse the policy landscape of two aspects of infectious disease management—adult vaccination and HBV management, identifying strengths, gaps, and opportunities, and making actionable policy recommendations to drive further progress.

2. Adult Vaccination: Opportunities, Challenges and Policy Recommendations

Compared to the well-established childhood immunisation programmes, the adult vaccination service system in China has significant room for growth to provide protection to the adult population and deliver economic benefits to the nation. Unlike childhood immunisation, which is mandated and publicly funded, adult vaccination rates are extremely low. The influenza vaccination rates in 2021-2022 were 2.47% across all groups and 32.94% for the elderly[32]. Despite being offered

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28 IQVIA. (2024). Economic Burden of Respiratory Syncytial Virus (RSV) Infection Among Older Adults in Select Asia-Pacific Economic Cooperation (APEC) Countries. https://www.iqvia.com/-/media/iqvia/pdfs/asia-pacific/white-papers/economic-burden-of-respiratory-syncytial-virus-infection-among-older-adults.pdf

29 Yan, M., et al. (2024). Economic burden of hepatitis B patients and its influencing factors in China: A systematic review. *Health Economics Review*, *14*(1). https://doi.org/10.1186/s13561-024-00584-6

30 Ibid.

31 Yin, S., et al. (2024). Spatial-temporal analysis of hepatitis B in Fujian Province, China in 2012–2021. *Infectious Medicine, 3*(2), 100110. https://doi.org/10.1016/j.imj.2024.100110

32 赵宏婷, 彭质斌, 倪兆林, 等. 2020-2021 和 2021-2022 年度流感流行季我国流感疫苗接种政策和接种

free of cost, elderly flu vaccination is well below the 75% WHO target coverage.[33] Adult vaccination policies also remain inconsistent and fragmented across different regions.

In many countries, healthcare institutions are the primary locations for adult vaccination efforts due to several benefits:

- Providing immunisation services within healthcare institutions ensures that doctors can recommend and prescribe vaccine for patients who are at a high risk of exposure and vulnerabilities, like those with comorbidities.[34]
- Healthcare workers who receive and recommend vaccines themselves act as role models, boosting public confidence in vaccines and reducing vaccine hesitancy. This, in turn, leads to increased vaccination rates among the general population.[35]
- Vaccination is a critical measure to protect the occupational health and safety of healthcare workers. The World Health Organisation (WHO) underscores that safeguarding healthcare workers from infectious diseases is essential to maintaining the continuity of medical services.[36]

2.1 Opportunities for Promoting Adult Vaccination in China

With rising demand, improved healthcare infrastructure, and the strong credibility of medical institutions and professionals, China has significant opportunities to strengthen its adult vaccination programme as a part of the wider PTI push for healthcare institutions to assume a greater role in infectious disease prevention.[37]

2.1.1 China is expanding its capacity and network of General Practitioners (GPs) and family doctors, who are well-positioned to make recommendations and prescribe vaccines to patients at higher risk of infectious diseases.

2.1.2 Improving public awareness of infectious diseases and vaccines has led to growing demand for adult vaccination services. As individuals become more proactive about disease prevention, the existing vaccination infrastructure—

情况调查[J]. 中华预防医学杂志, 2022, 56(11): 1560-1564. DOI: 10.3760/cma.j.cn112150-20220810-00802

33 World Health Organisation. (2019). Global influenza strategy 2019-2030.

34 The European House., et al. (2024). The value of prevention for economic growth and the sustainability of healthcare, social care and welfare systems.

35 Ibid.

36 World Health Organisation. Essential Programme on Immunisation. https://www.who.int/teams/immunization-vaccines-and-biologicals/essential-programme-on-immunization#:~:text=Building%20on%20the%20momentum%20of,the%20Essential%20Programme%20on%20Immunization

37 中国医药卫生文化协会疫苗与健康分会，中华预防医学会旅行卫生专业委员会(2024)。建立和完善我国医疗机构成人预防接种服务体系专家共识[J]. 中华预防医学杂志. 58(10), 1493-1500.DOI:10.3760/cma.j.cn112150-20240624-00499

primarily designed for children aged 0–6 years under the national immunisation programme—is struggling to meet the needs of a broader population across all age groups.

2.1.3 China's healthcare institutions are equipped with advanced facilities and systems, providing a strong foundation for scaling up adult vaccination services. Existing outpatient and inpatient systems, such as those for appointment scheduling, prescription management, and payment processing, can be leveraged to integrate digital solutions for vaccinations.

2.1.4 Healthcare institutions possess extensive expertise in vaccine evaluation and adverse reaction management, ensuring patient safety and confidence.

2.1.5 The public's strong trust in healthcare institutions and medical professionals will play a pivotal role in promoting vaccine acceptance.

Furthermore, China can leverage the valuable experiences of provinces already piloting adult vaccination programmes on a broader scale.

● Shandong Province is piloting adult vaccination prescriptions in at least two counties per city by the end of 2025 to encourage timely COVID-19, influenza, and pneumonia vaccinations for the elderly, chronic disease patients, and the immunocompromised. It is also developing "Technical Guidelines for Prescription-Based Adult Vaccination Services" to support implementation.[38] Similarly, Zhejiang Province has implemented a programme where general practitioners (GPs) and family doctors prescribe vaccines for middle-aged and elderly populations, focusing on immunisations for influenza, pneumococcal disease, and shingles. This programme prioritises training GPs and family doctors to provide effective vaccine recommendations, increasing public awareness around adult immunisation.[39]

By capitalising on these opportunities, China can improve policy frameworks, optimise service delivery, and create an efficient, accessible adult vaccination system to advance the Healthy China initiative.

2.2 Challenges for Promoting Adult Vaccination in China

It is important to recognise that healthcare institutions face significant challenges in establishing adult vaccination in healthcare facilities due to resource constraints, space limitations, and a lack of incentives and guidelines.[40]

2.2.1 Adult vaccination units are often managed under regulations designed for

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38 山东省疾病预防控制局(2024)。 关于印发《山东省预防接种服务提质行动工作方案（2024-2025年）》的通知。

39 浙江省疾病预防控制中心办公室(2024)。 浙江省疾病预防控制中心办公室关于印发浙江省中老年人群预防接种健康处方推广工作的通知。

40 中国医药卫生文化协会疫苗与健康分会，中华预防医学会旅行卫生专业委员会。 (n 38)。

childhood immunisation clinics, which fail to address the unique needs of adult vaccination. For instance, overly stringent requirements for clinic space and service standards, coupled with insufficient training and guidance for healthcare providers, create barriers to effective implementation. Furthermore, there is a lack of standardised and practical guidelines tailored to adult vaccination, including protocols for clinic setup, personnel allocation, service workflows, and digital integration.

2.2.2 Policy and institutional frameworks to support adult vaccination are also underdeveloped. While certain directives outline the responsibilities of medical institutions in infectious disease prevention, they lack actionable policies with clear implementation requirements.

2.2.3 Incentive mechanisms to encourage healthcare institutions to prioritise adult vaccination efforts are similarly insufficient. Limited resources and competing priorities within hospitals reduce motivation to establish vaccination units. Even in regions where comprehensive hospitals are authorised to administer vaccines, the absence of financial and operational incentives further discourages the allocation of resources and staff for vaccination programmes.

2.2.4 Many institutions fail to prioritise vaccination efforts or provide adequate education and training on vaccines for their staff. Healthcare workers also exhibit vaccine hesitancy due to inadequate training and knowledge about benefits of adult immunisation.[41] Their own attitudes toward vaccination undermine their ability to advocate for vaccines, reducing public confidence and contributing to vaccine hesitancy.

2.3 Policy Recommendations for Adult Vaccination

The challenges outlined above highlight the urgent need for top-level policy support and robust incentive mechanisms to strengthen China's adult vaccination programme.

2.3.1 Macro Strategy

2.3.1.1 Develop a Policy Framework to Integrate Vaccination into Clinical Services

Adult vaccination should be recognised as a critical component of the "Healthy China" and PTI initiatives, supported by a policy framework that drives long-term development. Top-level policies should reinforce the role of healthcare institutions in infectious disease prevention through increasing adult vaccination rates. Health authorities, disease prevention agencies, and research institutes should collaborate closely to conduct research, develop relevant policies, and

41 姜晓飞, 王中战, 纪文艳, 等. (2019). 北京市预防接种门诊开展成人预防接种意愿调查[J]。 首都公共卫生。 13(4), 169-172。

announce a clear call to action outlining next steps. Streamlining vaccine approvals, promoting alignment with global research, and expediting the rollout of advanced adult vaccines are critical steps to meet growing demand.

2.3.1.2 Prioritise Adult Vaccination Prescription by GPs and Family Doctors

The most effective and accessible approach to improving adult vaccination rates is through China's growing GP and family doctor system. During routine consultations, GPs could recommend vaccines based on individual risk profiles, such as age, chronic health conditions, and immune status, to ensure that vulnerable populations are protected. National programmes could build on efforts already underway in Zhejiang and Shandong Provinces, where GPs and family doctors are prescribing vaccines for key groups, including the elderly, those with chronic diseases, and the immunocompromised. Expanding such initiatives nationwide would enable better access to vaccines and improve coverage rates.

2.3.2 Implementation

2.3.2.1 Train General Practitioners

It will be critical to equip them with the necessary skills through routine training programmes is essential to ensure their effectiveness in this role. In particular, considering vaccine hesitancy, GPs must be equipped with the skills to effectively communicate scientific information about vaccines in an understandable and empathetic manner, addressing patients' concerns. This includes learning to tailor communication strategies to different patient groups, using evidence-based approaches to explain the safety, efficacy, and long-term benefits of vaccination while acknowledging and addressing misinformation or misconceptions.

2.3.2.2 Facilitate Digital Connectivity

Seamless integration between doctor prescriptions and community vaccination sites would enhance vaccine access for the elderly. Real-time data sharing with public health systems would enable dynamic monitoring, evaluation of coverage, and optimisation of strategies—improving efficiency while bolstering public health oversight.

2.3.2.3 Ensure Incentives for Participating Institutions and Personnel

Incentive policies are essential to ensure healthcare institutions and practitioners actively promote adult vaccination. General Practitioners' participation in vaccination work should be included in evaluation systems for technical title assessments, job promotions, and career advancement.

2.3.2.4 Standardise Guidelines for Adult Vaccination Facilities

On-site adult vaccination capacity in healthcare institutions will greatly facilitate

vaccine delivery. Healthcare institutions need guidance to establish adult vaccination programmes distinct from childhood immunisation. Drawing on expertise from public health institutions, academia, and pilot programmes, health authorities and disease control departments should collaboratively develop national policies, technical guidelines, and standards to guide the establishment of adult vaccination units, service workflows, vaccine management, administration techniques, and oversight mechanisms.

3. Hepatitis B Management: Progress, Gaps, Opportunities and Policy Recommendations

HBV remains a critical public health challenge in China. According to the latest data, China carries one of the highest burdens of HBV globally, with approximately 75 million people chronically infected.[42]

China has implemented several policies to combat HBV, focusing on vaccination, mother-to-child transmission prevention, and disease surveillance. Initiated in the 1990s, China's HBV vaccination programme ensures that newborns receive the first dose of the HBV vaccine within 24 hours of birth, followed by additional doses as part of routine immunisation schedules. This programme has been instrumental in reducing perinatal transmission and has achieved high coverage rates.

As a result, national vaccination programmes have effectively lowered HBV prevalence among children under five, from 9.67% in 1992 to 0.32% in 2014, with newborn vaccination coverage reaching 99% by 2012.[43] Additionally, a comprehensive set of guidelines for the prevention and treatment of chronic hepatitis B was also rolled out in 2022,[44] representing a step in the right direction to combat HBV holistically and support those currently living with HBV.

3.1 Policy Gap in HBV Management

Despite the success of vaccination programmes in children and comprehensive prevention and treatment guidelines, HBV infection rates in adults remain high at around 7%.[45] Diagnosis and treatment rates remain low—the diagnosis rate of HBV infection in China stood at only 24% in 2022, with a treatment rate of just

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42 Yan, R., et al. (2025). 2024 latest report on hepatitis B virus epidemiology in China: Current status, changing trajectory, and challenges. *Hepatobiliary Surgery and Nutrition*, *14*(1), 66–77. https://doi.org/10.21037/hbsn-2024-754

43 Wang, S., et al. (2016). Increasing coverage of hepatitis B vaccination in China. *Medicine*, *95*(19). https://doi.org/10.1097/md.0000000000003693

44 You, H., et al. (2023). Guidelines for the Prevention and Treatment of Chronic Hepatitis B (version 2022). *Journal of clinical and translational hepatology*, *11*(6), 1425–1442. https://doi.org/10.14218/JCTH.2023.00320

45 Hui, Zheng, et al. (n 17).

6.4%[46]—falling well short of WHO targets of 90% diagnosis and 80% treatment rates by 2030. The large undiagnosed and untreated population represents a significant barrier to HBV elimination. As mentioned earlier, this group has a high chance of progressing to chronic hepatitis, cirrhosis, and HCC—conditions that contribute to high rates of morbidity and mortality and economic burden on individuals and the healthcare system.

The "2017–2020 China Viral Hepatitis Prevention and Control Plan" sought to enhance public awareness, expand screening programmes, and incorporate HBV testing into routine health check-ups. In 2023, the State Council issued guidelines on promoting the high-quality development of disease prevention and control. This document laid out the need to comprehensively enhance professional capabilities in disease control and increase organisational support for implemention.[47]

However, treatment gaps persist. Despite the availability of effective antiviral therapies and recommendation for the expansion of antiviral therapy for a broader group of patients,[48] China continues to have one of the lowest HBV treatment rates worldwide and significant focus is needed to improve treatment and adherence rates. While affordability of HBV antivirals has significantly improved through centralised procurement and national insurance coverage, underdiagnosis and chronic adherence remain significant barriers.[49]

Additionally, HBV-related cancer prevention efforts remain insufficiently integrated into primary healthcare systems. The 2023 "Cancer Prevention and Control Action Plan" emphasised early screening for high-risk populations, which is critical for identifying and managing chronic HBV cases. However, without stronger integration with primary healthcare systems, these initiatives lack the reach and operational support needed to ensure timely diagnosis and effective treatment.

Bridging these HBV diagnosis and treatment gaps will require coordinated, evidence-based policies that emphasise screening, treatment accessibility, and integration with primary healthcare systems.

3.2 Functional Cure: A Breakthrough Innovation to Accelerate

46 World Health Organisation. (2024). Global hepatitis report 2024: action for access in low- and middle-income countries. ISBN: 978-92-4-009167-2

47 国务院办公厅. 关于推动疾病预防控制事业高质量发展的指导意见. https://www.gov.cn/zhengce/content/202312/content_6922483.htm

48 You, H., et al. (2023). (n 44).

49 Chen, S., et al. (2020). Combating hepatitis B and C by 2030: achievements, gaps, and options for actions in China. *BMJ global health*, *5*(6), e002306. https://doi.org/10.1136/bmjgh-2020-002306

Cheng, H., et al. (2022). Uptake of hepatitis B antiviral treatment: A panel data analysis of 31 provinces in China (2013–2020). *Liver International*, *42*(8), 1762–1769. https://doi.org/10.1111/liv.15321

the Fight for HBV Elimination

China's high prevalence of HBV infections indicates that vaccination alone will be insufficient to achieve the country's elimination goals and to prevent the costly progression into cirrhosis and hepatocellular carcinoma. According to WHO's global hepatitis report, there is an estimated return on investment of US$ 2–3 for every dollar invested in preventing liver cancer deaths and the costs of cancer treatment and care in the future.[50]

At the same time, current antiviral treatment is constrained by lifelong therapy with adherence challenges. Unlike current antiviral drugs, functional cure[51] therapy provides sustained HBsAg loss with a finite regimen, restoring immune response to control the infection, and the HBsAg loss leads to a lower risk of HCC.[52] It represents the optimal endpoint in the treatment of Chronic Hepatitis B. As highlighted in China's "Guidelines for the Prevention and Treatment of Chronic Hepatitis B", functional cure should be prioritised for eligible patients.[53]

Recent HBV functional cure therapy in late-stage development is poised to redefine the treatment paradigm by replacing lifelong medication with a six-month short course of treatment—delivering profound social and individual benefits.[54]

3.2.1 Its characteristics of a finite regimen and cure potential addresses patient reluctance toward lifelong antivirals, and motivates screening and treatment initiation, creating a "screen-treat-cure" cascade.
3.2.2 It offers hope for infected individuals to escape the predicament of lifelong disease and therefore improves patient dignity and unleashes productivity for the society.
3.2.3 It reduces risk of liver complications, including HCC, leading to an improved quality of life.
3.2.4 Although evidence is still emerging, functional cure's ability to reduce HBV DNA and HBsAg levels may decrease transmission risk in certain scenarios, such as reducing maternal viral loads to enhance the prevention of mother-to-child transmission.

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50 World Health Organisation. (2024). Global hepatitis report 2024: action for access in low- and middle-income countries. ISBN: 978-92-4-009167-2.
51 Functional cure for HBV is defined by the undetectable HBsAg and unquantifiable serum HBV DNA for at least 24 weeks after a finite course of therapy.
52 Yip, T. C.-F., et al. (2019). HBsAg seroclearance further reduces hepatocellular carcinoma risk after complete viral suppression with nucleos(t)ide analogues. *Journal of Hepatology*, *70*(3), 361–370. https://doi.org/10.1016/j.jhep.2018.10.014
53 You, H., et al. (2023). (n 44).
54 Yuen, M.-F., et al. (2022). Efficacy and safety of bepirovirsen in chronic hepatitis B infection. *New England Journal of Medicine*, *387*(21), 1957–1968. https://doi.org/10.1056/nejmoa2210027

While antivirals remain foundational for broad populations, innovative functional cure targets eligible patients seeking curative outcomes. It complements screening strategies and accelerates progress towards achieving the 2030 elimination milestones.

3.3 Policy Recommendations For HBV Management

3.3.1 Macro Strategy

3.3.1.1 Embed HBV Elimination into Policy Priorities

Hepatitis B elimination goals should be established as a key priority in top-level health policies, such as the 15th Five-Year Plan for National Health Planning. By embedding HBV elimination into mid-term strategic documents, this approach ensures sustained commitment, adequate resource allocation, and coordinated action across the country.

3.3.1.2 Develop Five-Year Action Plan Towards 2030 Elimination Milestones

A five-year action plan should be formulated with clear measures and phased targets to improve diagnosis and treatment rates. This plan should reference the existing guidelines for prevention and treatment[55], include measurable objectives for HBV testing in prioritised groups, aim to prevent disease progression into cirrhosis and hepatocellular carcinoma, and improve access to treatment. Phased milestones should guide progress toward achieving elimination goals, ensuring accountability and sustained momentum. Drawing on provincial HBV control pilots,[56] targets for the coming years could include testing rates, diagnosis rates and treatment rates. Furthermore, a national viral hepatitis monitoring system should be developed to track infections, diagnosis, and treatment while evaluating progress toward the hepatitis B elimination goals.

3.3.1.3 Accelerate Functional Cure Approval and Incorporate into Standard of Care

Functional cure in late-stage development for HBV represents an inflection point in the journey of eliminating Hepatitis B. Despite the success of existing vaccination programmes and treatments, elimination of HBV will not be achieved by relying on them alone. Incorporating and reshaping the current standard of care to include functional cure is key to positioning China for success in eliminating HBV.

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55 You, H., et al. (2023). (n 44).

56 海南省人民政府办公厅(2022)。 关于印发《海南省“2＋3”健康服务包实施方案》的通知；
人民网. (2022). 目标人群免费筛查福建六地区将试点乙肝规范化诊疗新模式;
http://fj.people.com.cn/n2/2022/1021/c181466-40166011.html
广东省人民政府办公厅(2023)。 关于印发《广东省病毒性肝炎早防早治行动方案》的通知

With the WHO goal deadline approaching and shifting demographic trends, accelerating the approval of functional cure therapy and embedding them in treatment guidelines should be a priority for China. Looking ahead, the national viral hepatitis monitoring system could track functional cures as a key performance indicator to measure and guide progress toward elimination goals.

3.3.2 Implementation

Identifying Innovative Funding Mechanisms to Ensure Access to Functional Cure

Making hepatitis B functional cure accessible is critical to supporting the Healthy China Initiative and realising broader socio-economic gains. These therapies could be added to the National Reimbursement Drug List, with a dedicated funding pool for innovative drugs to increase financial support for patients. Additionally, exploring an outcome-based payment model—focused on treatment success—and options to achieve a balance between medical insurance fund investment and patient outcomes would optimise the use of funding and drive cost-effective healthcare.

4. Conclusion

With China's current aging population, succeeding in preventing infectious diseases is crucial to sustaining economic growth and protecting public health. Advancing adult vaccination, integrating innovative treatments like the functional cure into HBV management presents siginficant opportunities to further promote PTI, and significantly reduce the health and economic burden of infectious diseases. These measures will decrease the incidence of severe complications, lower long-term healthcare expenditures, and improve overall population health. Advancing PTI to better manage infectious diseases will require continued close public-private partnerships across hospitals, private companies, government and patients across all disease areas, including Hep B, HIV and TB. Ultimately, acknowledging the importance of PTI and the key levers and stakeholders that will protect our population from infectious diseases, will result in healthier individuals who contribute to a more productive workforce, reduce caregiving responsibilities, and foster economic growth.