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Governing Global Public Goods: An Applied Research on Collaborative Malaria Prevention and Control in the Mekong Countries

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Abstract: In recent years, the world has been facing global issues such as the spread of pandemic and global warming. Countermeasures for these problems have been discussed using the concept of global public goods (GPGs). This article explores the necessity of establishing complex arrangements and governance structures for addressing global public goods, with an emphasis on the public health context, and combating infectious disease threats in particular. The article conceptualises malaria prevention and control as a global public good and suggests that its governance is likely to be more effective and sustainable if based on three multi-level settings: international rule-forming institutions; regionally embedded knowledge networks; and national cross-border infrastructures. Using the Mekong Countries as an empirical case, it evaluates the actor–recipient dynamics leveraging public health goods, and highlights the importance of adaptive, governance-rooted strategies for addressing epidemiological challenges. The article further argues that international norms must be activated and operationalised through both regional plurilateral and national bilateral pathways to build collaborative mechanisms and implement pragmatic health policies, thereby achieving effectiveness and sustainability. These findings contribute to cumulative theoretical insights into the transforming landscape of global health governance.

Keywords: global public goods, global health governance, malaria prevention and control, Mekong Countries, interregionalism

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1. Introduction

Malaria is a parasitic infectious disease transmitted through the bite of infected Anopheles mosquitoes or via the transfusion of blood containing malaria parasites. It poses a grave threat to human health and represents a major barrier to social and economic development (Wang et al., 2021). The World Health Organization (WHO) identifies HIV/AIDS, tuberculosis (TB) and malaria as among the most critical public health challenges requiring urgent global action. Of these, malaria – predominantly found in tropical and subtropical regions – places considerable strain on healthcare systems in endemic countries. This pressure exacerbates shortages in human capital, increases fiscal burdens and depresses economic growth (Bärnighausen et al., 2013). Conversely, reducing and eliminating malaria would increase the efficiency of national healthcare systems, improving their capacity to address emerging health-security threats. Declines in malaria burden are also associated with decrease in neonatal and maternal mortality, improvement in labour productivity and broader economic advancement. As a result, combating malaria prevalence has been recognised as a core priority of the United Nations Millennium Development Goals (MDGs) (Owens, 2014).

Against this backdrop, *global health governance* has emerged as an essential approach to addressing public health challenges. This article adopts a perspective that designates public health interventions as global public goods – herein referred to as *global health goods*. To clarify the nature of health-oriented global public goods, the WHO categorised "global public goods for health" into three types (Ress, 2013): 1. physical healthcare resources and technologies aimed at controlling infectious diseases such as medical interventions for TB and HIV; 2. knowledge and information access, including treatment guidelines, surveillance datasets, and communicable disease information systems that support containment; and 3. international rules and institutions that establish governance frameworks and coordination mechanisms for global health. This macroscopic categorisation provides the scaffold for understanding how global health goods function and reciprocal dynamics arise in combating infectious diseases.

Building on the above foundation, this article reviews the existing scholarship and examines the research foci and approaches within global health governance. In particular, it investigates the interaction of actors–recipient feedback loops that shape the provision and distribution of global health goods. The research discussion is anchored in the concept of "governance", which underscores the mechanisms through which global health goods are administered and coordinated. The concept of global health governance crystallised in the mid-1990s, stemming from the work of the Commission on Global Governance (Lee & Kamradt-Scott, 2014), as a response to contemporary health challenges. Within this domain, regional health governance offers an analytically appropriate geographical scale and constitutes a vital component for scrutinising governance commitments and performance. It entails cooperative and coordinated actions managing public health threats within specific regions – such as malaria prevention and control in the Mekong River Basin – through continuous endeavours among a range of geopolitical and geoeconomic stakeholders, including national governments, regional and international organisations and non-state actors.

Accordingly, this article designates the multi-level mechanisms for malaria prevention, detection and response in the Mekong Countries as the focal point of the case study. The region holds not only geo-strategical significance but also one of the world's most severely malaria-affected areas. Treating it as the core of the analysis here facilitates a nuanced exploration of the complex architecture of global health governance, yielding insights of both theoretical and practical relevance. The case embodies generalisable features as well as context-specific characteristics of collaborative governance in the provision of global health goods targeting infectious disease control. This article seeks to broaden understanding by offering perspectives on the design of governance frameworks and by informing policy formulation across wider spatial and institutional arenas. Through a problem-driven analytic pathway, it interrogates the core elements of global health governance – the object of governance (*what* is governed), the rationale of governance (*why* it is governed), and the institutional and operational modalities through which governance is enacted (*how* it is governed).

2. From global public goods to global health governance: An evolving conceptual framework

When discussing conventional public goods, analyses typically begin with the canonical rivalry–excludability matrix (Figure 1) in economics to classify a good's underlying properties. However, extending this framework straight to the global scale requires greater caution. Within the matrix, globally salient issues do not necessarily constitute pure public goods. Depending on institutional arrangements and the technologies of production and control, they may instead take the form of *public goods* (non-rival, non-excludable), *club goods* (non-rival but excludable), *common-pool resources* (rival yet difficult to exclude), or *private goods* (rival and excludable) (Adams & McCormick, 1987). What renders a good "global" firstly lies in the spatial reach and magnitude of its external effects, whereas its position in the matrix is contingent and can shift across geographic, social and temporal axes, reflecting the complexity of the real-world settings (Kaul et al., 1999). Against this backdrop, global public goods (GPGs) denote goods distinguished by a high degree of publicness, whose benefits or harms are transboundary and welfare-relevant at the global scale, rather than confined to discrete jurisdictions (Kejžar & Ponikvar, 2023). Moreover, GPGs vary in their properties of validity, such as climate-change mitigation produces cumulative benefits and typically requires sustained collective action; whereas vaccines and many pharmaceutical technologies are frequently "lumpy", representing the discontinuity and is contingent upon substantial, time-sensitive provision to be effective (Mendoza et al., 2024).

Corresponding to the ideal economic notion, GPGs possess the intrinsic characteristics of publicness, *non-rivalry* and *non-excludability* alongside wide spillover range (Buchholz & Sandler, 2021). When an actor benefits from a GPG, it does not diminish the capacity of others to do likewise; once provision occurs, exclusion is difficult or infeasible. Conversely, viewed through the risk–cost lens, the deepening interconnectedness driven by trade and migration has amplified cross-border externalities,

Figure 1
The rivalry–excludability matrix for the classification of goods
Source: Adams & McCormick, 1987.

increased the frequency and systemic spillover potential of transnational risks, heightening the burden-sharing challenges inherent in the provision of GPGs. Global phenomena such as epidemics, regulatory vacuums, armed conflicts and financial crises constitute escalating threats to global stability and living standards. Although these challenges affect the world as a whole, the most vulnerable are the least developed countries, owing to economic and political fragility, weak social safety networks and limited access to emergency assistance (Cornes & Sandler, 1996). These asymmetries shape prognoses regarding the supply of GPGs, as well as the urgency and design of provision-related interventions, prompting corresponding institutional reforms.

Traditionally, the intuitive understanding of GPGs has emphasised tangible embodiments as illustrated by infrastructure, information transmission and financial flows. Stiglitz (1995) categorises GPGs into a variety of domains: international economics, security, the international environment, humanitarian assistance and knowledge. Amidst these, knowledge encompasses universally applicable scientific truths that benefit humanity at large, as well as intellectual advancements with welfare gains, which initially accrue to specific countries or populations before being conditionally disseminated. Stiglitz (1999) mentions that a key factor to sustaining globalisation lies in the integration of global knowledge with local expertise, particularly in developing countries, where their capacity to leverage the benefits of global knowledge and the development of "knowledge infrastructure", such as healthcare system, critically shapes development trajectories. In parallel, global institutions, born out in response to expanding governance demands, have a pivotal role in translating GPGs into policy interventions addressing global issues. Increasingly, scholars argue that the ontology of governance itself should be regarded as a form of GPG, especially when examining the transnational institutional arrangements to tackle concerns such as the prevention and control of pandemics. Birdsall and Diofasi (2015) emphasise that GPGs encompass the institutions and the outcomes that yield near-universal benefits across countries. This holistic conceptualisation of GPGs recognises the very act of governance mechanisms, governmental or non-governmental institutions, formal frameworks or collaborative networks that enable cross-border cooperation toward shared objectives (Rosenau, 1992), not merely as facilitators of public goods, but as a fundamental public good in their own right.

The viewpoint of Stiglitz represents a pioneering awareness of global health goods, as a distinct interpretation of GPGs within the realm of public health. A historical narrative can be traced back to the 4th-century CE guidebook by the Chinese physician Ge Hong (葛洪), which documented emergency prescriptions using the herb of Qinghao (青蒿； Artemisia annua) to treat intermittent fevers (Moon, 2008). Sixteen centuries later, this corpus of traditional knowledge contributed to Chinese researchers' identification of artemisinin as a potent anti-malaria compound during the Vietnam War (Gartner, 2012). In contemporary practice, artemisinin-based combination therapies remain the clinical mainstay for malaria, exemplifying how medical knowledge – when transferred, validated and refined – can evolve into a paradigmatic GPG. This knowledge lineage highlights the fundamental idea of global health goods in advancing public health. In current discourse, global health goods are commonly understood to encompass the following aspects: 1. health-focused research and development (R&D); 2. communicable disease control including epidemiological surveillance, immunisation and medicine; and 3. health-related information – largely non-excludable – exemplified by standardised data collection and dissemination systems (Smith et al., 2003). These components form the backbone of modern global health goods, highlighting the necessity of international collaboration and universal accessibility in addressing health challenges across borders.

The prevention and control of infectious diseases also reveal the dual nature of GPGs. Owing to the substantial spillovers, infectious-disease outbreaks are regarded as Global Public Bads (GPBs) – the analytical inverse of GPGs. While containment is universally desired, outbreaks themselves inflict widespread, non-excludable harms (Kaul & Faust, 2001), imposing costs on societies far beyond the locus of initial transmission. Conversely, effective disease control in one country can yield positive externalities for others, reinforcing the rationale for transnational collective action. Wealthier or medically advanced states therefore have strong realistic incentives (or face normative pressures) to invest in prevention and control efforts in developing countries, catalysing the proliferation of disease-targeted global health initiatives. This, in turn, provides and argument for the necessity of Global Health Governance (GHG). GHG refers to the foundational and transitional processes through which global governance regime for health is established, involving diverse stakeholders – states, intergovernmental organisations, non-state actors and private entities – in responding public health challenges characterised by "deterritorialisation", requiring collective and cross-border actions for effective health solutions (Dodgson et al., 2002). The salience of public health within international relations (IR) discipline stems from its intrinsic interdependence among states, as reflected in international policy coordination. At the global level, institutions such as the WHO, UNAIDS and the World Bank function as key multilateral platforms for GHG. In addition, transregional state actors increasingly shape global health through transgovernmental engagement. In 2007, the foreign ministers of seven countries from different regions – including Brazil, France, and Norway – issued the Oslo Ministerial Declaration, launching the Foreign Policy and Global Health Initiative to promote GHG via diplomatic collaboration, and to embed health governance more deeply into the multilateral foreign- policy agenda (Sandberg et al., 2016).

Figure 2
Conceptual evolution from global public goods to global health governance
Source: Compiled by the authors.

Figure 2 illustrates a three-step logical deduction: beginning with the foundational concept of global public goods (GPGs); moving to their healthcare-oriented, real-world instantiation as global health goods; and culminating in the health-specific steering mechanisms of global health governance (GHG). This conceptual evolution from GPGs to GHG underscores the interconnected nature of medical needs and the imperative for sustained cooperation among state and institutional actors to fortify disease prevention and control. As global health threats continue to emerge, the adaptability and resilience of a complex, multi-level governance framework is indispensable for ensuring equitable and comprehensive responses.

3. Malaria in the Mekong Countries: Inequality and securitisation

Countries in the Mekong River Basin – Cambodia, Laos, Myanmar, Vietnam and Thailand – commonly referred to as the Mekong Countries,[1] have long faced persistent threats from infectious diseases, with malaria being one of the most severe and enduring challenges. Although concerted efforts between the 1950s and 1990s gradually eradicated malaria foci in lowland and urban areas of certain countries, the disease resurged due to multiple precipitating factors at the beginning of the 21st century. Since malaria disproportionately affects impoverished populations, its prevalence closely mirrors the intertwined socio-political surroundings and ongoing economic transformations. At present, Cambodia and Myanmar rank among the countries with the highest malaria burden worldwide (Cui et al., 2012a).

Geographically, the region is characterised by extensive forest landscapes serving as the epicentres of malaria outbreaks and epidemics. These areas are thus identified as "forest malaria" zones specific to the Mekong context (Prothero, 1999). In many Mekong Countries, underdeveloped infrastructure leaves rural villages without adequate access to

[1] The Mekong Countries refers to the five states located in the Mekong River Basin. This group is commonly represented by the acronym "CLMVT". The Mekong Countries have also been known as "Indochina" culturally, or "Mainland Southeast Asia" geographically. This article conceptualises the Mekong Countries as a specific (sub) region-oriented cluster of international actors to more precisely define the participation and intervention of political entities in the Mekong River Basin affairs.

essential public health goods, heightening vulnerability to malaria transmission. Furthermore, border areas with high population mobility tend to record elevated infection rates compared to urban settings, the phenomenon termed "border malaria" (World Health Organization, 2010). The persistent transmission of malaria, compounded by scarcity of medical resources has positioned the Mekong Countries as the global hotspot for the emergence and spread of anti-malaria drug resistance. Epidemiologically, Myanmar has consistently reported the highest incidence and malaria-induced mortality rates in Southeast Asia over the past three decades – a governance failure pattern largely attributable to prolonged regime instability and the ensuing international sanctions. Since 2019, estimated malaria cases in the country have risen more than tenfold (World Health Organization, 2024), with a direct spillover effect on neighbouring Thailand, where reportedly imported cases have also markedly increased. These predicaments have imposed significant socio-economic burdens, especially on large rural communities in both countries (Cui et al., 2012b).

Historically, state actors in the river basin have concentrated primarily on domestic concerns despite facing similar public health threats, resulting in sluggish progress toward regional public health governance. Since the 1990s, the Mekong Countries have increasingly relied on the importation of GPGs – particularly medical assistance provided by intergovernmental organisations and NGOs as non-state actors – to improve regional healthcare quality and promote cooperation. Within the cooperative framework of the Greater Mekong Subregion (GMS), which includes China alongside the five Mekong Countries, malaria control was identified as a priority for subregional collaboration as early as 1994 (Asian Development Bank, 2005). The first subregional health forum convened in 2007 to facilitate knowledge sharing and exchange on epidemic-prevention practice. A further milestone was reached with the First Meeting of the GMS Working Group on Health Cooperation (WGHC-1) in 2017 (Greater Mekong Subregion Secretariat, 2017). Despite these efforts, health governance among the Mekong Countries remains predominantly reliant on fragmented, project-based assistance, and has yet to form a comprehensive and institutionalised structure.

Efforts toward interstate collaboration are constrained by divergent governance capacities, differing national interest perceptions and geopolitical considerations within the basin. Notable disparities persist in epidemic prevention and health system efficacy. Thailand possesses a comparatively advanced health sector and has assumed the frontrunner position in regional public health cooperation. Vietnam has experienced rapid progress, whereas Laos, Cambodia and Myanmar are lagging in socio-economic development and continue to face internal capacity restraints. With the growing frequency of transboundary material and personnel exchanges, the risk of infectious disease transmission is intensifying – unilateral or small-group responses are no longer sufficient. A shift toward pragmatic, collaborative action is an urgent necessity. However, cooperation among state actors is frequently undermined by fluctuating bilateral relations and changes in multilateral geopolitical climate. The Mekong Countries, in particular, carry a historical legacy of interstate tensions and security dilemmas, especially during the Cold War era of clashing ideological blocs, which have led to circumscribed armed confrontations and divergent pursuit of national security agendas. Thereby, the securitisation of health issues

adds a further layer of complexity to implementing cooperation and governance (Burci, 2014).

The concept of health securitisation entails framing health challenges as security threats and reallocating resources accordingly. It typically treats health issues as external crises requiring neutralisation, rather than as shared agendas necessitating pragmatic solutions (Holst & Pas, 2023). In parallel, health securitisation shapes stakeholders' perception of actors as well as issues, cultivating "securitised" mindsets. Novotny et al. (2013) argue that when health issues are perceived as public health crises directly tied to national interests, they are more likely to receive political prioritisation. This constructive dynamic is evident in the handling and sharing of infectious-disease samples: rather than being regarded as straightforward instruments for the circulation of public health goods, they frequently become sensitive and securitised matters – particularly during periods of heightened political conflicts – perceived as potential threats to national security.

4. Complex public health governance in the Mekong Countries

The severity and distinctiveness of malaria epidemic in the Mekong Countries make the region a critical case for GHG. Methodologically, existing gaps in institutional development and interstate cooperation do not encapsulate the whole picture of public health governance in the basin. In contrast with the limited progress of top-down governance architectures, localised cross-border joint prevention and control arrangements among the five countries have demonstrated considerable effectiveness in addressing infectious disease challenges, and have become an essential component of regional public health governance. To provide a comprehensive analysis, this article employs the *multi-level governance* approach to explore the full spectrum of governance dynamics in the region. Following Gary Marks's foundational formulation, multi-level governance system arises when the proliferation of institutions and the reallocation of decision-making authority disperse formerly concentrated governance functions within the state across territorial tiers – supranational, national and subnational – thereby institutionalising continuous intergovernmental consultation and dialogue (Marks, 1993).

Accordingly, the case study of the complex public health governance in the Mekong Countries examines: 1. the role of international regimes in epidemic prevention at the global level; 2. the macro functionality of health cooperation mechanisms among the Mekong Countries at the regional level; and 3. the micro-level implementation of local/cross-border infectious disease management by state and substate units. Prior research reveals that disease surveillance in many developing settings is hampered by structural weaknesses, including shortages of trained personnel and equipment, inadequate communication and transportation infrastructure and poor coordination among local authorities (United States General Accounting Office, 2001). Against such backdrop, this article adopts the conceptualised governance framework to address the fundamental question of how collaboration in the provision of public goods, especially in infectious disease control and resources management, has evolved and taken shape in the Mekong Countries?

4.1. The global level: International framework, implementation and goals of "Roll Back Malaria"

Institutions and rules are widely regarded as the cornerstone of sustained international cooperation and the implementation of global governance. Keohane (1984) argues that institutions enhance the predictability of actors' behaviour, reduce uncertainty in international interactions, lower transaction costs and diminish the likelihood of conflicts, thus fostering cooperation and stability. Since the 1990s, the paradigm of rule-based governance has gradually become a prevailing discourse in IR scholarship. Rosenau (1992) posits that governance fundamentally connotes a system of rule, while Keohane and Nye (2000) assert that governance encompasses both formal and informal institutions and processes that guide and constrain the collective actions of social groups.

Complementing this institutional focus, social constructivism emphasises the impact of soft-binding norms in sustaining peace and cooperation beyond formal arrangements, particularly through how norms shape the identities, preferences and interests of actors. Consequently, norm diffusion and actor socialisation become crucial pathways to global governance. From this perspective, the transmission of norms is often conceptualised as a process flowing from "West" to "non-West", from "advanced" to "backward", and from the international level to regional level. Finnemore (1996) characterised the dissemination of international norms as a "teaching" process undertaken by transnational actors and international organisations. Goldizen (2016) illustrates how the WHO socialises member states to internalise public health norms by adhering to its rules and procedures. Such compliance yields recognition and privileged access to information critical for disease prevention and control.

On the other hand, the notion of *Microbialpolitik* originated in the late 19th century, when European powers convened multilateral conferences and treaty regimes in response to infectious disease outbreaks emanating from the Americas, Africa, and Asia (Fidler, 1998). Early efforts aimed to mitigate the external threat by the establishment of quarantine zones at ports (Fidler, 2005). After World War II, advancements in environmental sanitation and medical technology diminished the infectious disease burdens in developed countries. Health governance subsequently shifted from border control to "source control", while human rights, equity, development and diplomacy became prominent drivers of international health cooperation. Following the Cold War, trade expansion and economic liberalisation raised cross-border health risks, elevating public health on the global agenda (Kickbusch, 2016). As Keohane and Nye (2000) note, one of the most profound linkages of globalisation is the movement of biologically relevant substances. Emerging and re-emerging infectious diseases not only threaten human life but also pose unprecedented challenges to global political and economic order, bringing public health squarely into development debates and catalysing the rise of GHG.

GHG plays a critical role in addressing the complexity of disease prevention and control. Effective governance ensures the coordination of financial resources, political commitment and scientific expertise to mount responses to transnational health threats. Malaria is the core concern in GHG for governmental and non-governmental actors. Organisations such as the WHO and the Global Fund to Fight AIDS, Tuberculosis and

Malaria (GFATM) have supplied strategic guidance and implementation frameworks, including the Global Malaria Action Plan, and "Roll Back Malaria". Launched in 1998 by WHO, UNICEF, UNDP and the World Bank, the Roll Back Malaria (RBM) initiative sought to synergise efforts and resources in combating malaria (Feachem, 2018). At the time, malaria was highly prevalent in Africa and Southeast Asia affecting an estimated 3.2 billion people and causing direct economic losses up to USD 12 billion annually. In the Mekong River Basin, recurrent spread and rising of drug resistance posed especially formidable challenges (World Health Organization & UNICEF, 2005).

The RBM initiative marked the world's first comprehensive strategic blueprint targeting a single disease. It has provided global health goods – policy guidance, medical support and financial aid – fostering cooperative actions among countries to implement malaria elimination and raise disease awareness. Its strategic priorities include early detection and prompt treatment; strengthened pathogen control; maternal health education; focal interventions during emergencies or outbreaks; and support for innovative prevention tools, technical research and standardisations (World Health Organization, 2000). Initially UN-led programme, RBM has evolved into a global partnership comprising malaria-endemic countries, UN authorities, bilateral and multilateral agencies, NGOs, academia, private sector and philanthropic foundations (Atta & Zamani, 2008). Its governance structure consists of regional networks, national partnership advisers, high-profile advocates and technical working groups formulating consensus on best practices. Oversight is provided by the board of directors, with a secretariat at the WHO headquarters coordinating partner contributions and needs (Traoré, 2005).

Because large-scale malaria control requires substantial, sustained financing beyond the capacity of most malaria-endemic countries, RBM has collaborated with the GFATM and the Bill & Melinda Gates Foundation (BMGF) to mobilise targeted resources overcoming chronic funding gaps. This endeavour has elevated malaria as a visible policy priority within health and socio-economic agendas (Coll-Seck, 2008), facilitating both near-term control programmes and long-term eradication ambitions through stakeholder collaboration, technological innovation and strategy refinement via broad social consensus. The initiative's headline objective was to halve global malaria mortality by 2010 and to achieve an additional 50% reduction by 2015 (The Lancet, 2008).

Despite the impetus from global initiatives, initial results in the Mekong Countries were limited. The distribution of standardised medications, diagnostics and clinical service beyond urban centres remained challenging, leaving malaria in a high-risk oscillation. Until 1999, the Mekong Roll Back Malaria Initiative – jointly launched by the UN, WHO, World Bank, USAID and the Mekong governments – tailored the global RBM campaign to the regional context. The Mekong RBM Initiative has generated localised data, developed treatment protocols, introduced rapid diagnostic tools, and enhanced institutional cooperation to build durable disease-management capacities (World Health Organization, 2006). It specifically targeted vulnerable populations, including impoverished communities, ethnic minorities and migrant labourers in remote areas, addressing gaps in health information and service delivery. The initiative aimed to

reduce malaria mortality in the Mekong subregion by 50% from 1998 levels by 2010 and curb the spread of drug-resistant malaria strains (Asian Development Bank, 2000).

Even so, overreliance on top-down guidance and externally driven capacity-building is insufficient. Coming to the era when global major powers are unable to assume leadership and reluctant to underwrite a reliable supply-demand system for global health goods, GHG risks falling into the "Kindleberger Trap"[2] (Campbell & Doshi, 2020). In this context, the cultivation of governance elements within regional frameworks becomes vital, particularly in the Mekong Countries where infectious diseases are prevalent and preventive infrastructure is comparatively weak. Thus, regions have emerged as ideal strategic meso-level governance spaces between the national and global levels, capable of tackling shared challenges, managing interdependence and delivering collective public health goods.

4.2. The regional level: Cooperation in infectious disease prevention and control under the expertise-based network structure

The Mekong Countries have participated in GHG since the late 20th century, gradually establishing professional networks of public health experts across the region. These networks comprise scholars, medical personnel and officials from central authorities and local health departments. A defining feature is their capacity to rapidly acquire up-to-date information, concepts and techniques from external sources, leveraging professional expertise to secure policy and operational support internally (Manzoni et al., 2024) and to curb misinformation. Through sustained peer interaction, these experts have facilitated the exchange and consolidation of field knowledge and health policies, deepened mutual trust, and expanded the scope for collaborative actions. This dynamic not only exemplifies the essence of knowledge as a GPG but also aligns with core strands in International Relations, regarding the intellectual notion of "expert consensus" and the classical paradigm of "epistemic communities".

Ikenberry (1992) argues that the formation of transnational agreements rests on expert consensus among specialists in professional fields. The expert agency shapes governments' rational perceptions of interests and contributes to the construction of new power coalitions. On issue-specific agendas, experts' policy perspectives are typically built upon a robust knowledge base, and the complexity of such issues amplifies their dominant role. As mechanisms and priorities have diversified, GHG has gradually centred on the principle of "evidence-based science decisions" (Kentikelenis et al., 2023), further magnifying the agenda-setting power of expert consensus.

Epistemic community originates from the confluence of bureaucratic positions, technocratic expertise, shared disciplinary training and collective behavioural expectations, intentions and norms, synergising the institutionalised cognitive architecture in

[2] The *Kindleberger Trap* refers to the notion that the stability of an international system requires the presence of a hegemonic power – one capable of providing GPG for upholding international order, such as international reserve currency and collective security. When the existing hegemon retreats from its commitments, the resulting power vacuum tends to undermine the effectiveness of global governance and exacerbates systemic instability.

international society. Haas (1992) defines an epistemic community as a transnational network of experts widely recognised within fields for their knowledge and technical competence. Through authoritative discourse on specific themes, epistemic community helps construct transnational order grounded in knowledge-based norms, thereby shaping the national policy outcomes. Cross (2013) emphasises that professionalism serves as the driving force behind epistemic-community behaviour, while uncertainty – particularly during crises – acts as the endogenous force heightening its influence.

From the GHG perspective, the uncertainty of power dynamics and the challenges posed by regional expert networks to prevailing distributions of public health goods create opportunities for reshaping governance via transgovernmental interactions within health-focused epistemic communities. Alternatively, the complexity of policymaking and the interconnectedness of specific domains frequently necessitates the inclusion of multidisciplinary professionals and relevant agencies. For instance, effective epidemiological investigation inevitably requires the involvement of law enforcement, while transboundary environmental governance entails coordination between ecological, environmental and economic policy actors. As epistemic communities evolve, their membership tends to broaden and consolidate, incorporating actors from diverse backgrounds. In the regional public health sphere, the strategic mobilisation of expertise to establish new professional norms, design alternative institutions, and foreground "civilisational diversity" has emerged as a plausible pathway to alleviate the Kindleberger Trap in GHG, particularly amid intensifying great power competition (Cooley et al., 2015). Acharya (2011) argues that epistemic communities can function as "filtering" mechanisms beneath formal international decision-making, identifying locally applicable policy options that strengthen both feasibility and legitimacy.

In the Mekong Countries, public health expert networks were initially informal, with a small number of expert panels in each country. Consequently, there was a significant overlap among individuals participating in multiple networks for joint tasks and exchanges. Over time, institutionalisation followed. In 1996, under the initiative of the Ministry of Health of Thailand, the Asian Collaborative Training Network for Malaria (ACT Malaria) was established. Its membership encompasses ASEAN – particularly the five Mekong Countries – alongside Timor-Leste and China. With WHO financial support, ACT Malaria enhanced its institutional architecture in 1999 by setting up the permanent secretariat in Bangkok and adopting a rotating leadership system. ACT Malaria pursues two primary objectives. First, to build an expert network of malaria specialists from member states and WHO personnel responsible for training and technical guidance – fostering capacity building among grassroots health workers, disseminating control methods and information, and facilitating the uptake of new technologies. Second, it promotes exchanges among member states on malaria control in border areas. The initiative has incorporated external actors such as international donors and pharmaceutical enterprises, laying a well-rounded foundation for subsequent infectious disease prevention and control in the region (World Health Organization, 2022a).

By the late 20th century, epidemiologists in the Mekong Countries had recognised pronounced disparities in medical and public health standards, as well as obstacles to horizontal exchange of sensitive epidemic information. In response, the Mekong Basin

Disease Surveillance (MBDS) system was launched in 2001. MBDS monitors communicable diseases, including malaria, and facilitates interstate data sharing. Its surveillance scope covers infection rates, outbreaks severity and the spatial characteristics of disease clusters, with the overarching goal of mitigating basin-wide transmission risk. The advantage of MBDS lies in its constituents of national coordinators, typically senior public health officials. As cooperation deepened and issue complexity grew, the national coordinators have cultivated close working ties and become well-acquainted with their transgovernmental counterparts (Slaughter, 2004). These interfunctional interfaces and interpersonal linkages have strengthened the effectiveness of MBDS's trust-based network and integrated regional health governance practices into coordinators' respective homelands. Notably, MBDS has set up cross-border stations bringing together health, customs, immigration and border security officials to coordinate healthcare and epidemic prevention policies at the regional level (Phommasack et al., 2013).

In a similar vein, based on the long-standing cooperation, the Mekong Countries and China officially launched the Mekong Malaria Elimination (MME) programme in 2017 – an initiative involving upstream and downstream constituents of the entire drainage system[3] to coordinate efforts toward eliminating all malaria pathogens. The core focus of MME includes promoting dialogue and partnerships, optimising technical support for regional and interregional projects, conducting monitoring activities, and assisting countries in strengthening national elimination intensification plans (World Health Organization, 2022b). The programme's cornerstone is the Malaria Elimination Database, a regional platform that collects, compiles and issues monthly malaria data from subnational health units, using 2010 as the baseline for statistical trends. Access to the MME database enhances surveillance and assessment capabilities, supports analysis of distribution hubs and transmission trajectories, and facilitates knowledge diffusion through publications such as epidemiological summaries and annual bulletins (Delacollette et al., 2009). Importantly, in both geographical and institutional scope, malaria cooperation between the Mekong Countries and China exemplifies the governance concept of "interregionalism" – an emergent mode of spatial governance involving regional groupings and external powers that transcends strictly regional boundaries (Gardini & Malamud, 2018). At the same time, as the predominant actor within the interregional cooperative configuration, China is able to coordinate and support comparatively weaker Mekong partners, helping to offset regional capacity disparities and mitigate collective action dilemmas that would otherwise arise in a single region.

Since the 2000s, the Mekong Countries have collaborated on a therapeutic efficacy monitoring network comprising 32 sentinel sites across the basin. The network tracks antimalarial drug resistance through in vivo testing (World Health Organization, 2007). In 2014, with funding from the GFATM, the Regional Artemisinin-resistance Initiative

[3] In terms of natural geography, the Mekong is a transboundary hydrological system of the upstream–downstream type formed by the convergence of numerous tributaries. Based on hydrological characteristics and topographical structure, it is conventionally divided into the Upper Mekong, referring to the Lancang River Basin, and the Lower Mekong, generally known as the Mekong River Basin. The area ratio of the two catchments is approximately 1:4. The Lancang River segment within China extends to 2,139 kilometres, while the Mekong River section flowing through the five downstream countries covers a total length of 4,880 kilometres.

(RAI) was launched to strengthen detection and mitigating mechanisms for drug-resistant malaria in the Mekong Countries (RAI Regional Steering Committee, 2023). The aforementioned cases demonstrate that the Mekong Countries have actively embraced collaborative approaches to addressing infectious disease challenges. Through regional interactions, public health experts have constructed a dense governance network for prevention and control – rooted in shared knowledge and mutual trust – that bridges information and implementation, facilitates the propagation of healthcare technologies and standardisations as global public goods, and ultimately advances complex health governance at the regional magnitude.

4.3. The national level: Cross-border joint control and collaborative governance in the relational perspective

Since the 21st century, the Mekong Countries have reached a concord in that effectively controlling the cross-border spread of infectious diseases requires a joint disposition mechanism, as well as an information-sharing platform with neighbouring states. In response, the five countries have enhanced corresponding domestic malaria elimination policies and engaged in bilateral collaborative governance (Hewitt et al., 2013).

The bilateral approach highlights the logic of relationality as the key determinant of national-level health governance, with practices shaped by socially embedded relationships. Compared with global and regional arenas, national-level relational networks in the Mekong context exhibit denser, more explicit connections – an interplay of environmental uncertainty, shared motivations and joint-action capacity fostering stronger collaboration (Emerson et al., 2012), with the social nature of relational processes being particularly salient. Over the past two decades, the cross-border joint prevention and control of malaria have been a mainstream feature of national-level health governance across the Mekong Countries, progressing alongside localised and neighbourhood expert networks initially, evolving through phases of establishment, expansion and maturity.

For instance, Cambodia and Thailand pioneered cross-border cooperation (Khamsiriwatchara et al., 2012), strengthening surveillance and vector control ensuring timely and medical access to artemisinin-based combination therapy (ACT) for populations in both countries. Both governments have actively supported community-based epidemic prevention through information and education campaigns, convened regular bilateral technical conferences between national malaria programmes, and issued unified messages concerning mobile and migrant populations. Malaria control initiatives have been formally incorporated into the Thailand–Cambodia Health Development Cooperation Programme, which has standardised infectious disease management through joint training in surveillance and emergency response for healthcare personnel, while maintaining robust intergovernmental communication channels. On the eastern frontier, Vietnam and Laos collaborate in mountainous, forested border provinces inhabited by ethnolinguistically related minorities. A systematic mechanism for exchanging surveillance data enables joint tracking of transmission in the grand remote areas. Additionally, Vietnam

provides Laos with critical public health goods, such as insecticide spraying and ACT medications, to tackle cross-border healthcare resource disparities (Pongvongsa, 2012).

Through interventions operating across multiple levels, the Mekong Countries have partially alleviated the socio-economic burden of malaria by coalescing around the provision of GPG. Yet classic collective action dynamics of public goods would typically predict a chronic capability–legitimacy gap (Acharya, 2012) regionally, wherein incentives for specific state actors to free-ride, uneven institutional strength, and coordination failures undermine sustained cooperation. The Mekong experience shows that constraints have been moderately attenuated through a functional division of labour within GHG architecture. International actors and institutional frameworks help consolidate legitimacy by providing policy guidance, technical standards, and – most crucially – sustained financing that endemic states often cannot mobilise independently. On the other hand, national and bilateral health infrastructures and initiatives augment the capacity dimension by translating basin-wide externalities into tractable, recurrent cross-border interactions, enabling more precise resource allocation and risk reduction in borderlands, even when wider multilateral cooperation at times proves geopolitically fragile. Currently, Thailand and Vietnam, as subregional leaders in elimination, are actively identifying and targeting residual transmission hotspots, combining case detection with focal vector control and appropriate antimalarial therapy to interrupt active foci (Mueller et al., 2022). Meanwhile, Cambodia and Laos are implementing the "Last Mile to Malaria Elimination" roadmap to accelerate progress (Sovannaroth et al., 2022). In Myanmar, bilateral collaborations with neighbouring partners have established a Cross-Border Malaria Elimination Zone (Xu et al., 2016), supported financially by Cambodia, Thailand and China. The approach has laid a foundation for sustained prevention and control by securing stable funding and reliable health-system infrastructure, which are prerequisites for reducing incidence and halting transmission within the country.

Moving beyond the past marked by conflict-prone interactions and weak technopolitical coordination, the Mekong Countries have increasingly responded to health securitisation through joint interstate control and collaborative governance. This evolution illustrates the tandem "development–security" nexus underlying the pattern of contemporary security governance – the dual-track dynamic reveals where security serves as a prerequisite for development, and development, in turn, reinforces security (Hettne, 1997). Ultimately, aligning the mutually constructed evolving logic of development and security within the framework of GHG should become a core task for all Mekong Countries.

5. Theoretical reflections and empirical implications

The Mekong River basin is one of the most active regions in the world for the formation of cooperation and development mechanisms. Over recent decades, state and non-state actors from within and beyond the basin have launched numerous initiatives and governance frameworks spanning multiple development dimensions. This trend has driven the rapid proliferation of mechanism constructions in the region while intensifying competition among states and their lead institutions, giving rise to the

depicted phenomenon of "institutional congestion" (Pich, 2022). At the same time, as outbreaks of existing and emerging infectious diseases continue to pose challenges to humanity, the remit of health governance has expanded beyond the mere formulation of public health strategies or the establishment of medical systems within a single spatial domain. Instead, it now embraces a range of actions undertaken by actors including scientific community, political authorities and the public – across routine and emergency contexts, multiple issue areas (science, economics and society), and multifaceted spatial levels (global, regional and national) – with the shared aim of safeguarding health. Public health governance is not a static entity but rather a dynamic, evolving process. Compared to traditional governance models focusing on the diffusion and enforcement of international rules, GHG – rooted in GPG approaches as manifested in malaria control agendas – exemplifies an innovative, multi-dimensional and multi-level governance complex (see Figure 3).

Cooperation on infectious disease prevention and control among the Mekong Countries has achieved progress from its initiation through stages of development. This process serves as a practical example for navigating the complexity of GHG, which involves a diverse constellation of actors. Collectively, these actors constitute partnership networks that underpin the delivery chain flow of GPGs and facilitate spatial implementation centred on fulfiling healthcare supply and demand circulation within an actor–recipient nexus – denoting multilevel providers to recipient systems and populations, encompassing downstream flows of rules, knowledge and resources, and upstream feedback whereby field

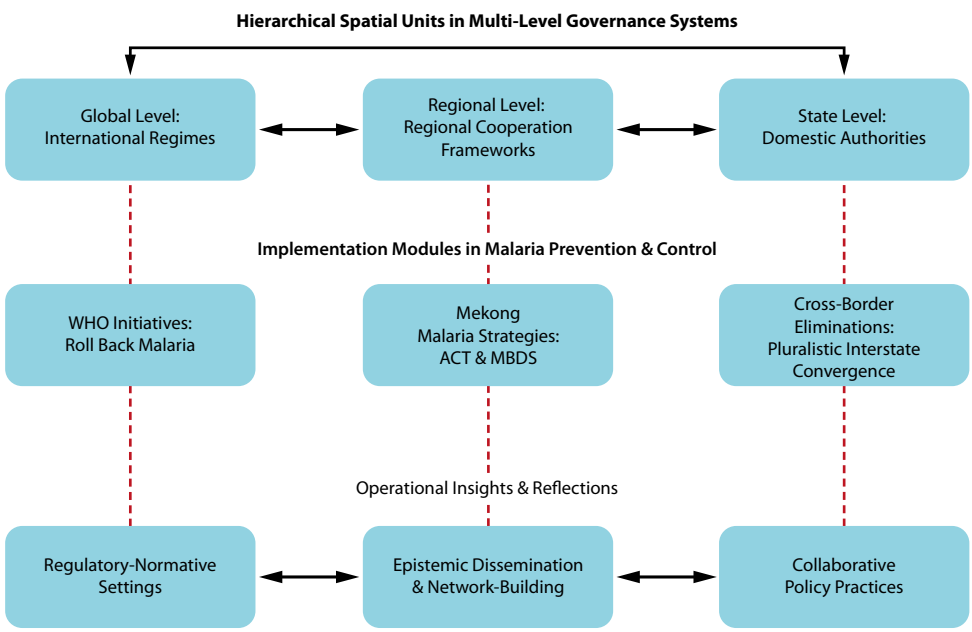

Figure 3

Multi-level malaria governance architecture in the Mekong region

Source: Compiled by the authors.

uptake, constraints and epidemiological signals recalibrate design, allocation and coordination. At the global level, health regulations, frameworks and goals set up by the international community constitute the "institution-based GPGs", which are then operationalised and disseminated to the lower tiers. At the regional level, social networks of public health and epidemiological expertise comprising professionals and technical authorities in the Mekong Countries who are conversant with international standards and advanced treatment protocols, play a crucial role in granting the "knowledge-based GPGs". Besides, transgovernmental coordinators and liaisons familiar with international norms and regulatory mechanisms help bridge global–regional interfaces, translating knowledge-based public goods into real-time policy decisions and practices, thereby shaping the regional and interregional coordinating authorities.

At the national level, tangible "resource-based GPGs" are manifested through the complementarity and interoperability of public health infrastructure. In this context, stronger states assist weaker counterparts as credible "hub" providers that stabilise essential provision over time, thereby creating a coherent mechanism for tempering collective action impediments. Furthermore, frontline physicians and healthcare workers familiar with local conditions adapt regulations and standards into localised solutions to meet the needs of endogenous circumstances. Notable examples include the "8-day course" of primaquine regimen, identified by Mekong-based experts through practical experience, which has proven to be more cost-efficient and better accepted by local populations compared to the WHO-recommended 14-day course because of its shorter duration, lower cumulative dosage and reduced side effects (Taylor et al., 2019). Another example is the China-led "1–3–7" malaria surveillance and response approach, carried out in the Mekong Countries for pathogen source investigation and rapid intervention (Aung et al., 2020). These reformed methods and their successful implementation feed back into and enrich the existing regional and global system, becoming integral components of the holistic GHG.

For instance, building on extensive consultations involving malaria programme officials from health authorities of the Mekong Countries and other relevant stakeholders – with support from the WHO Regional Office for South-East Asia and the Western Pacific, as well as the WHO GMS Antimicrobial Resistance Emergency Response Regional Center – the WHO subsequently launched the "Strategy for Malaria Elimination in the Greater Mekong Subregion 2015–2030" (World Health Organizations, 2015). Aligned with the organisation's 2015 Global Technical Strategy for Malaria, the 2015–2030 strategy marks a milestone culmination of multi-level collaboration in GHG.

6. Conclusion

Over the past few years, the world has experienced the most severe pandemic in a century, which not only claimed millions of lives and undermined global health, but also inflicted a heavy blow on the world economy and intensified geopolitical risks. The scale and magnitude of its impact have even surpassed those of traditional political and economic security threats. In the aftermath of such disruption, the international community must now pursue more comprehensive and systematic thinking on

advancing plurilateral cooperation and governance mechanisms for infectious disease prevention and control in the post-Covid era.

In summary, health-associated governance issues derived from the recognition of public health as a public good carry greater significance than the solely availability-focused concerns of public health goods, particularly in global regions characterised by heterogeneous social, historical and cultural contexts, as well as uneven extents of national development. Evidence from the Mekong Countries yields critical findings. International frameworks supply indispensable standards, financing logics and legitimacy, yet seldom secure implementation in peripheral settings. Regional networks serve as the translation layer, converting global inputs into shared technical repertoires, harmonising surveillance and sustaining trust-based coordination across jurisdictions. Infrastructures among nations turn the foregoing deliverables into operational capacity and generate feedback that recalibrates regional and global designs. Overall, multi-level governance architecture emerges as a central determinant of GPG/GHG performance.

Nevertheless, scholarships on the complex public health governance models remain in its nascent stage, further exploration is especially warranted to facilitate a metatheoretical transition from the provision of GPGs to the governance of GPGs. Within this process, it is essential to clarify the ontological and definitional divergences that persist between academic theorisation and practical implementation in the field of GHG. Moreover, acknowledgment must be given to the catalytic function of external actors in shaping GHG responses to transnational health challenges. This entails examining how the proactive engagement of both state and non-state actors can be optimally integrated with the establishment of rule-based, technically oriented institutions. Such integration is vital to enhancing the effectiveness and sustainability of governance – particularly in regions where state capacity in public health realm is relatively limited. From the macro perspective encompassing human health survival, security and development, this is a research area which holds noteworthy academic attention due to its practical relevance.

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