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Health System Capacities and Policy Responses to a Global Health Crisis: A Comparative Study Between Thailand and China

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Abstract

The governance and sustainability of health systems are essential for human well-being, particularly during public health crises like COVID-19. Despite achieving low fatality rates and high vaccination levels, Thailand and China have adopted both similar and distinct policy responses to the pandemic. This study conducts a qualitative analysis based on documentary research to examine the policy responses of both countries and the underlying rationale. The analysis is framed by the six building blocks of health system strengthening as proposed by the World Health Organization (WHO). It also incorporates an examination of health system responses and governance capacities during public health crises to evaluate the policy decisions of both nations. The findings reveal that the policy responses of Thailand and China are influenced by the respective strengths of their health systems and governmental capacities. Both countries adhered to WHO operational guidelines for combating COVID-19; however, China implemented these measures more rigorously. Thailand, characterized by a robust health system but limited governance capacity, adopted a "Coexistence with COVID-19" policy, reopening the country once vaccines became available. Conversely, China's relatively weaker and fragmented health system necessitated a stringent "Zero-COVID" policy, heavily relying on its governance capacity to manage the pandemic. Therefore, governance capacity, alongside health system strength and responsiveness, is critical in determining policy responses during public health crises.

Keywords

Health System, Governance, COVID-19, Thailand, China

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Introduction

The governance and sustainability of health systems are fundamental to human well-being and pivotal during public health crises. Universally, all countries are pledged to achieve sustainable development goals (SDGs) by 2030, which includes 17 goals and 169 targets (United Nations, 2023). Particularly, these elements are crucial for achieving targets 3.8 and 3.13 of SDG 3 aiming at ensuring "healthy lives and promote well-being for all at all ages", which focus on universal health coverage (UHC) and strengthening global health risk capacities, respectively (United Nations, 2023). Before the COVID-19 pandemic, the UHC index improved from 45% in 2000 to 68% in 2019. However, one-quarter of the global population still faced catastrophic health spending (World Health Organization, 2023b). The pandemic severely disrupted 92% of essential health services worldwide in 2021, with 84% of those disruptions persisting into 2022, significantly impeding UHC progress and health system reforms.

The first COVID-19 case was reported in Wuhan, China, on December 31, 2019, with Thailand reporting the first case outside China on January 13, 2020. (Department of Disease Control, 2020). By September 2023, there were 770,778,396 confirmed cases and 6,958,499 deaths globally, accounting for 0.009% (World Health Organization, 2023c). The pandemic's impact varied regionally, with Europe experiencing a peak of 24 million cases in January 2022 and the Western Pacific region peaking at 44 million cases in December 2022 following China's abandonment of its zero-COVID policy. Southeast Asia peaked in May 2021 with 2.8 million cases, while Thailand saw its peak in March 2022 with 182,510 cases. China, however, experienced its peak in December 2022 after abandoning its 3 years zero-COVID policy and when all other regions and countries had overcome their peak and were already open countries (World Health Organization, 2023c). Despite these numbers, both Thailand and China maintained lower fatality rates than the global average, partly due to high vaccination rates. By February 2021, 13.5 billion vaccine doses had been administered worldwide 2021 (World Health Organization, 2023a). Thailand and China reported vaccine administration rates of 199.54 and 239.03 doses per 100 population, respectively, both exceeding the global average of 173.26 (World Health Organization, 2023c). Notably, China achieved a faster and more efficient vaccination rollout compared to Thailand during the early stages of the pandemic in 2021 (Polwiang, 2023; Zheng et al., 2021).

In light of notable advancements in vaccination programs and disease control measures, China opted to adopt a zero-COVID approach spanning three years, while Thailand embarked on a phased reopening of its borders to international tourism in July 2021, amidst a backdrop of relatively modest vaccination rates. Subsequently, Thailand transitioned to a coexistence strategy as immunization coverage expanded. Despite the temporal and strategic disparities in their pandemic responses, both nations have

demonstrated notable success in mitigating public health crises, evident in their low fatality rates and high vaccination coverage. Therefore, a comprehensive examination of the strategies and responses adopted by China and Thailand offers valuable insights into how the decision-making processes influenced by health system capacity during public health emergencies, in conjunction with the pivotal role of governance capacity in shaping policy preferences amidst crises. This study posits that, beyond the robustness of the health system and crisis response mechanisms, the governance capacity emerges as a pivotal determinant shaping policy preference in response to public health crises.

Literature Review

The attainment of Universal Health Coverage (UHC) stands as a pivotal factor in bolstering health system capacity. Thailand and China both achieved UHC in 2002 and 2011, respectively (Yu, 2015), but followed different paths in health system reform. Essentially, the primary healthcare system (PHC) is crucial for achieving UHC (Patcharanarumol et al., 2016). Additionally, the PHC holds significant potential to enhance Thailand's UHC framework to ensure sustainability, efficiency, equity, and efficacy (Sumriddetchkajorn et al., 2019). Thailand's progressive reforms in PHC since the 1960s have yielded substantial enhancements in financial protection and a reduction in health-related impoverishment. The evolution of PHC reform in Thailand dates back to 1961 when healthcare facilities were established to provide coverage at the district and subdistrict levels. Subsequent reforms in 2002 focused on health financing, followed by the strengthening of the primary healthcare system (Saechang, 2021). Evidently, the UHC reform in 2002 has improved health-related catastrophes and poverty resulting from healthcare expenditures, thereby lifting many Thais out of poverty (Prakongsai et al., 2009; Somkotra & Lagrada, 2008). Significantly, the incidence of health catastrophes decreased from 5.74% in 2000 to 2.26% in 2017, while health impoverishment rates improved from 2.01% to 0.32% over the same period (National Health Security Office, 2018). China, on the other hand, had a strong healthcare system before the reform and opening up era in 1978, weakening during the market-oriented era before undergoing a major reform in 2007 (Bhattacharyya et al., 2011). Despite augmented government health expenditures, the Chinese healthcare system continued to exhibit fragmentation, inefficiencies, and suboptimal quality standards (Brixi et al., 2011; Eggleston et al., 2008; Yip & Hsiao, 2014; Yip et al., 2010; Yip et al., 2012). Recent reforms have sought to integrate healthcare delivery systems; however, comprehensive assessments of these initiatives are still pending.

Thailand's health infrastructure comprises sub-district health promotion hospitals and community hospitals, bolstered by village health volunteers who play vital roles in public health crises. The healthcare delivery system in Thailand is predominantly pluralistic, with a strong public sector presence and centralized governance. The structural framework includes

Tambon Health Promotion Hospitals (THPHs) at the sub-district level taking care of 5,000 people, community hospitals in each district covering 50,000 population, and general hospitals at the provincial level, with some serving as regional referral hospitals covering the population of 600,000 (World Health Organization, 2017). These facilities, established in the 1960s, were integrated into the Contracting Unit for Primary Care (CUP) post the UHC reform in 2002, ensuring seamless care provision nationwide. The CUP is a network of a hospital and 10-15 primary healthcare centers to provide a range of comprehensive services to a population of 50,000 in its catchment area (Primary Health Care Division, 2014). The Ministry of Public Health owns 62% of hospitals, with the private sector and other public agencies owning 25% and 13% respectively, out of a total of 1,451 hospitals (Strategy and Planning Division, 2019).

The public primary healthcare system in Thailand is dominated by the private sector (55%), yet, the public primary healthcare centers of 9,793 THPHs upgraded in 2009, were the cornerstone of the primary healthcare system. These THPHs are essential in providing disease prevention, health promotion, health treatment, and health rehabilitation, while private clinics focus on providing outpatient care and vaccination programs. Historically, these THPHs have not typically provided services such as inpatient care; however, this dynamic is changing. As part of a healthcare decentralization effort, 3,264 THPHs (33.39% of the total) were transferred to local government organizations on October 1, 2022 (Bureau of Information, 2022). This shift aims to enhance the primary healthcare system's quality, efficiency, effectiveness, and equity, aligning services more closely with the needs of local communities. Notably, village health volunteers have been integral to Thailand's healthcare landscape since the 1990s. Initially serving as local leaders, their roles evolved significantly after the health system reform in 2002. They were empowered to take on the responsibilities of village health managers and leaders, focusing on changing health-related behaviors within their communities (Primary Health Care Division, 2014). During the COVID-19 pandemic, these one million village health volunteers emerged as a crucial asset in Thailand's response efforts of tracing and identifying at-risk individuals by knocking on every house, contributing significantly to the early phases of the pandemic response (Narkvichien, 2020). Their high level of participation nationwide has been instrumental in sustaining and delivering primary care services, underscoring their importance during public health emergencies

In contrast, China's healthcare system, dominated by public primary healthcare institutions, grapples with service fragmentation and unequal resource distribution. While China has a higher number of private hospitals compared to public hospitals, the latter account for a larger share of beds (Yip et al., 2019). Private hospitals in China provided a significant proportion of outpatient (14.2%) and inpatient (17.6%) care in 2017, yet their capacity to meet public healthcare needs remains inadequate and disproportionate. Unlike

Thailand, China's primary healthcare institutions are primarily publicly owned and offer inpatient care services, with a notable share of outpatient and inpatient care being provided by these centers (National Bureau of Statistics, 2023). In 2016, these primary healthcare centers provided 55% of outpatient care and 18% of inpatient care (Li et al., 2017). These disparities in resources and service utilization between the two countries underscore the varying capacities of their respective health systems.

China's health system, once robust pre-1978, faced challenges during market reforms but initiated significant primary healthcare reforms in 2007. Following the establishment of the People's Republic of China (PRC) in 1949, the health system relied on barefoot doctors who emphasized community-based promotion and prevention care, establishing a relatively strong primary healthcare system (Weiyuan, 2008). Marketization reforms after China's transition to a market economy in 1978 led to the emergence of the "*kan bing nan kan bing gui"* sentiment, signifying difficulties and high costs associated with healthcare access, prompting governmental intervention. In response, in 2007, the government launched a comprehensive reform plan prioritizing equity and equal access to basic healthcare by 2020, increasing health expenditures significantly from 2008 to 2017. The expenditure rose from 359 billion RMB to 1.52 trillion RMB, equivalent to a rise in total government expenditures from 5.7% in 2008 to 7.5% in 2017 or 1.1% and 1.8% of GDP, respectively (Yip et al., 2019). In 2012, the reform began to shift towards health system delivery. A series of public hospital reforms and the strengthening of primary healthcare as a foundation strategy for the health system to realize Healthy China by 2030 were implemented. However, the system remained largely fragmented both at an administrative level and healthcare service level (Ramesh et al., 2014). On the provider side, prevention, primary care, and tertiary and rehabilitative services were separated. Additionally, it was challenging to identify the proper purchaser. China's early reform provided mixed and unclear evidence of its outcome (Wagstaff et al., 2009).

Despite progress, challenges persisted, with the health system remaining fragmented and inefficient, characterized by a focus on drugs, costly diagnostic tests, and a shortage of qualified healthcare professionals. Reforms targeting provider incentives, public hospital governance, and regulatory frameworks were deemed essential for system improvement (Brixi et al., 2011; Eggleston et al., 2008; Yip & Hsiao, 2014; Yip et al., 2010; Yip et al., 2012). Recent initiatives, such as the County Medical Community System, resembling Thailand's CUP model, aimed to enhance integrated healthcare delivery through provincial and county-level networks. Initial assessments indicated cost reductions and improved primary healthcare services under these models, particularly when funded through global budgets or capitation (Yip et al., 2019). However, further evaluation is necessary to gauge the effectiveness of these evolving healthcare delivery systems.

Essentially, a robust health system enhances a country's ability to navigate public health crises effectively. The World Health Organization (WHO) has identified six building blocks for strengthening health systems: service delivery, health workforce, health information systems, access to essential medical products, vaccines and technology, health financing system, and leadership and governance (World Health Organization, 2007). Health financing and workforce are considered inputs, while service delivery, information systems, access to essential medical products, vaccines, and technologies represent immediate outputs, with leadership and governance at the core of the framework. Particularly, Service delivery, health financing, and workforce play crucial roles in reinforcing healthcare systems at the district or primary care level (Rakmawati et al., 2019). Additionally, the WHO has outlined four key public health and social measures for addressing COVID-19: suppressing transmission, reducing exposure, protecting vulnerable populations, and reducing overall mortality and morbidity while saving lives (World Health Organization, 2021).

The health system building blocks and key measures serve as a conceptual framework for assessing the strength of health systems, as depicted in Figure 1. More importantly, governance responses are pivotal in managing public health crises, underscoring the importance of considering both health system and governmental actions in comparative studies of crisis responses between countries like Thailand and China. Through a comparative analysis, insights and policy recommendations can be gleaned to foster mutual learning and a deeper understanding of healthcare complexities. This study employs documentary research as a qualitative method to evaluate how Thailand and China responded to global health crises, focusing on factors related to health system strengthening framework and comprehensive policy responses from both the health system and government.

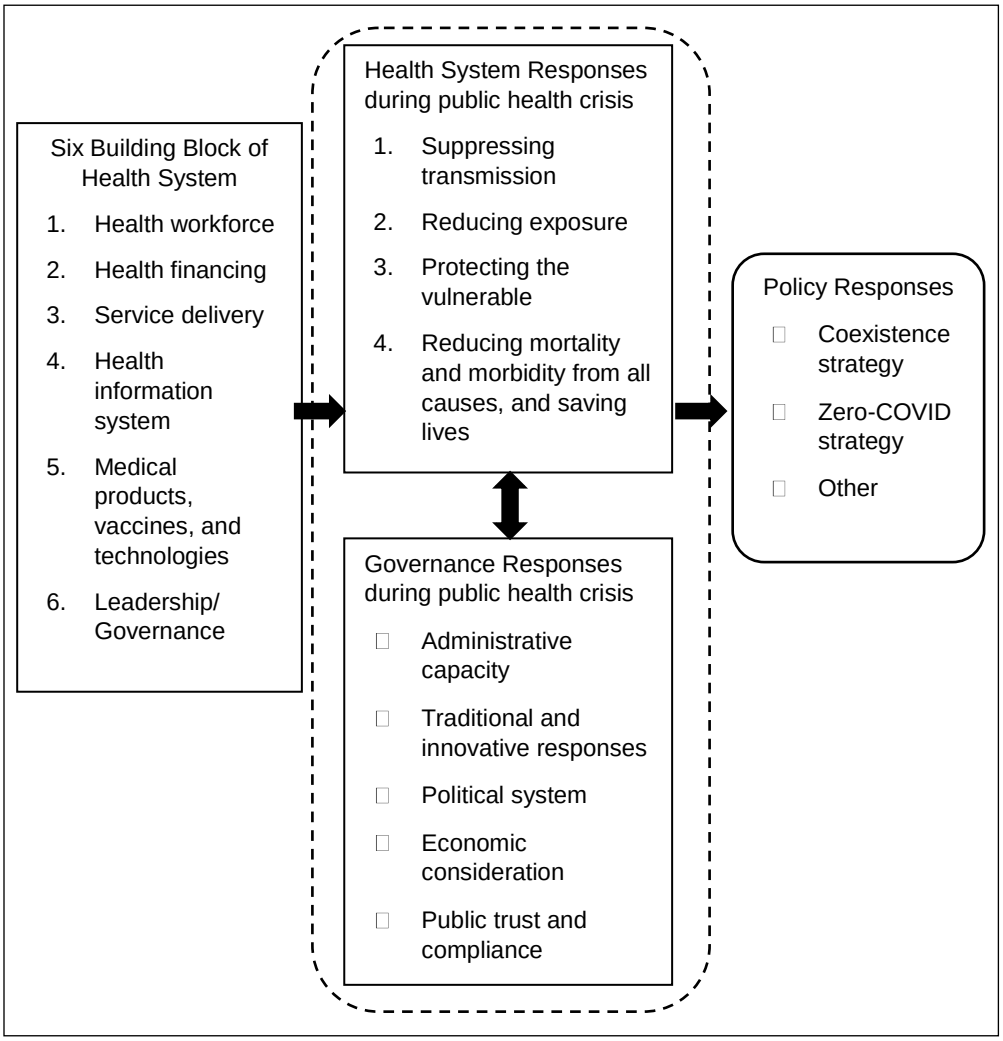

Figure 1 Conceptual Framework for this study

Source: Author, 2023

Research Methodology

This study utilizes documentary research to examine how the six building blocks of the health system influence responses to public health emergencies, shaped by governance capacity and resulting in distinct policy approaches in Thailand and China. The research begins with a literature review to establish research questions and a conceptual framework. Comparative data on COVID-19 cases, vaccination rates, fatality rates, health resources, financing, and service delivery in both countries are collected from international sources such as the World Bank, the World Health Organization, and the OECD, as well as national databases including the Health Data Center, Strategy and Planning Division, Department of

Disease Control of the Ministry of Public Health, and National Health Security Office in Thailand, and the National Bureau of Statistics and National Healthcare Security Administration in China. Peer-reviewed literature is also analyzed for relevant insights.

Content analysis is then employed to categorize the data and articles into the six building blocks of the health system, health system responses during public health crises, and governance responses. The study concludes by presenting and discussing the findings, emphasizing the distinctive policy responses implemented by Thailand and China in managing public health crises.

Comparison of the Six Building Blocks of the Thai and Chinese Health System Strength

Six building blocks for strengthening the health system are health workforce, health financing system, service delivery, health information systems, access to essential medical products, vaccines and technology, and leadership and governance (World Health Organization, 2007). Since the first three blocks are crucial in strengthening the local healthcare system (Rakmawati, Hinchcliff, and Pardosi 2019), this study will thoroughly examine and compare these components of both health systems.

Thailand and China have similar health outcomes but differ in the health workforce, expenditure, and health utilization as demonstrated in Table 1. Comparing Thailand and China, China has more doctors, nurses, and beds per 1,000 populations with higher healthcare expenditures. Thailand spends less on healthcare but provides services more efficiently. Despite these differences, both countries achieve above-average health outcomes. Life expectancy in Thailand is 79 years and in China is 78 years, with low Infant Mortality Rates and Maternal Mortality Rates compared to the world average. These findings suggest that despite varying healthcare resources and expenditures, both countries deliver commendable health outcomes.

Table 1 Health Resources, Financing, and Outcomes between Thailand and China

Indicators	**Thailand (year)**	**China (year)**
Doctor/1000 population	0.9 (2019)	2.5 (2021)
Nurse/1000 population	3.2 (2019)	3.5 (2021)
Bed/1000 population	2.1 (2010)	5.2 (2021)
Outpatient Care visits	275 million or 3.68 times/person/year (2023)	8.472 billion times (2021)
Inpatient Care visits	6.632 persons	2.473 billion times (2021)
Hospital stays (days)	4.36 (2023)	9.2 (2021)
Bed occupancy rate	76.99 (2023)	74.6 (2021)
Health expenditure (% of GDP)	3.79 (2018)	5.7 (2020)
Out of Pocket expenditure (% of current health expenditure)	12.11 (2016)	34.8 (2020)
Out of Pocket expenditure /capita (USD)	26.88 (2016)	341 (2020)
Health spending/capita (USD)	221.92 (2016)	979 (2021)
Life expectancy at birth (years)	79 (2021)	78 (2021)
Infant Mortality Rate (IMR) per 1000 live births	7 (2021)	5 (2021)
Maternal Mortality Rate (MMR) per 100,000 live births	29 (2020)	23 (2020)

Source: Author's adaptation from (Central Intelligence Agency, 2023; Ministry of Public Health, 2023; National Bureau of Statistics, 2023; OECD, 2023; World Bank, 2023)

In terms of health financing, Thailand operates three main public health insurance schemes covering 99.9% of its population as revealed in Table 2. The Civil Servant Medical Benefit Scheme (CSMBS) caters to 5.2 million civil servants and their families through general tax contributions. The Social Security Scheme (SSS) covers 12.5 million private sector employees with equal contributions from employees, employers, and the government. The Universal Health Coverage Scheme (UC) extends coverage to approximately 47 million Thais who are not yet covered by the first two types, funded by general tax. Despite

variations in utilization rates, all schemes provide significant health coverage. Thailand has made substantial progress in health financing protection, as evidenced by reduced rates of health-related impoverishment and catastrophic health expenditures (National Health Security Office, 2018). The household number of being impoverished also greatly reduced (Tangcharoensathien et al., 2020). This success indicates improved access to healthcare services, particularly for UC beneficiaries who face minimal financial barriers.

Table 2 Three main public health insurance schemes in Thailand as of 2020

	Civil Servant Medical Benefit Scheme (CSMBS)	**Social Security Scheme (SSS)**	**Universal Health Coverage Scheme (UC)**
Legislation	Royal Decree 1980	Social Security Act 1990	National Health Security Act 2002
Purchaser	Comptroller General's Department, Ministry of Finance	Social Security Office, Ministry of Labor	National Health Security Office, Autonomous Public Organization
Provider	All public hospitals and private hospitals in case of emergency	Contracted public and private hospitals	Registered contractors, notably the network of public hospitals (CUP)
Population coverage	5.2 million Government employees plus dependents including parents, spouse, and up to 2 children (8.1%)	12.5 million Private sector employees excluding dependents (19.5%)	46.3 million, The rest of the "Thai" population not covered by CSMBS and SSS (74.2%)
Source of finance	General tax	Tripartite contribution, equally shared by the employer, employee, and government	General tax

Table 2 Three main public health insurance schemes in Thailand as of 2020 (continued)

	Civil Servant Medical Benefit Scheme (CSMBS)	**Social Security Scheme (SSS)**	**Universal Health Coverage Scheme (UC)**
Outpatient visit in 2023 (times/person/year) 3.80	4.38	2.84	3.80
Inpatient care in 2022 (days/person/year) 4.38	4.81	4.11	4.37

Source: Author's adaptation from (Ministry of Public Health, 2023; Tangcharoensathien et al., 2018)

As for China, following the 2007 health system reform in China, social health insurance now covers 95% of the population, amounting to 1.345 billion individuals by 2022 as illustrated in Table 3. The Urban Employee Basic Medical Insurance Program (UEBMI) serves 27% of the population, while the Urban Rural Resident Basic Medical Insurance (URRBMI) covers the remaining 73%, consolidating the New Rural Cooperative Medical Scheme (NRCMS) and the Urban Resident Basic Medical Insurance (URBMI). The contribution of each scheme varies by country to county. Although with only one-third of the insured population, the UEBMI contributes and spends double that of URRBMI insurers. Despite differences in insured populations, both insurance types exhibit similar outpatient care utilization rates. However, URRBMI-insured individuals utilize inpatient care more frequently but incur lower costs compared to UEBMI beneficiaries. In other words, the urban employees insured by UEBMI contributed to the scheme more and utilized more health resources than the urban and rural residents under URRBMI, making health financing and health utilization unequal and inefficient. The health system reform has enhanced health utilization for urban and rural residents but has not effectively alleviated financial burdens, especially for the underprivileged (Fang et al., 2019; Shi et al., 2022). Further improvements are needed to ensure equitable access and financial protection for all segments of the population in China.

Table 3 Social Health Insurance Scheme in China as of 2022

	Urban employee basic medical insurance (UEBMI)	**Urban rural resident basic medical insurance (URRBMI)**	**Total**
Launch Year	1998	Merged the following two schemes in 2016 • 2003: Rural New Cooperative Medical Scheme (RNCMS) • 2007: Urban Resident Basic Medical Insurance (URBMI)	
Coverage	95%	95%	95%
Insured people (billion)	0.3643 (27%)	0.98349 (73%)	1.345 (95%)
Contribution	Employer and Employee	Individuals with Government subsidies (70%)	
Income (trillion RMB)	2.0793 (67%)	1.0129 (33%)	3.0922
Expenditure	1.5244 (62%)	0.9353 (38%)	2.4597
Outpatient Care (billion visits)	2.04	1.9	
Inpatient Care (million visits)	60	160	
Inpatient Care (hospital days)	9.5	9.2	
IPD (expenses/capita)	12,884 RMB	8,129 RMB	

Source: Author's adaptation from (National Healthcare Security Administration, 2023; Shi et al., 2022)

Thailand's health system is well-organized with 13 health networks covering the entire country, featuring an integrated health information system. This is exemplified by the national electronic Malaria information system which obtains a high level of simplicity, acceptability, stability, and flexibility (Ma et al., 2016). Specifically, it reports data and completes all critical data in a timely and acceptable time. Conversely, China's health system is undergoing integration efforts, leading to a fragmented information system (Wang et al., 2019). Despite this, the public in China widely uses social media for health information (Zhang et al., 2017). This public usage of digital technology further facilitates digital surveillance during the pandemic

Both countries swiftly vaccinated their populations during the pandemic, with China achieving a faster vaccination rate. After the first batch of vaccinations was deployed in February 2021, Thailand and China quickly vaccinated their people. The ratio of vaccine doses administered per 100 population in both nations is 199.54 and 239.03, respectively, both exceeding the global average of 173.26 (World Health Organization, 2023c). Thailand began COVID-19 vaccinations on February 28, 2021, and initiated a nationwide campaign on June 7, 2021 (Polwiang, 2023). China accelerated its vaccination efforts significantly, administering less than 4 million doses daily before March, increasing to 4.8 million in April, over 10 million in May, and peaking at 24.7 million doses on June 24, 2021 (Zheng et al., 2021). By August, 79.1% of the Chinese population had been vaccinated compared to 9.67% of the Thai population (Polwiang, 2023; Zheng et al., 2021). Vaccination rates were even higher in major cities, with 88.5% of people in Beijing and 79.1% in Shanghai having received the vaccine (Zheng et al., 2021). In summary, China managed to vaccinate its population more quickly and efficiently than Thailand.

Finally, due to differing political systems, Thai health system leadership is prominent, while Chinese political or administrative leadership holds authority over health system leadership. The reform of the Thai health system towards Universal Health Coverage (UHC) is facilitated by the "Triangle that Moves the Mountain" theory, emphasizing evidence-based knowledge, political commitment, and social movements (Wasi, 2000). The Health System Research Institute (HSRI) was established to provide evidence-based knowledge, supported by strong political commitment and active participation from civil organizations and the public. This collaborative approach has enabled Thailand to achieve UHC despite lower GDP.(Tangcharoensathien et al., 2007). It can be said that the reform and governance of the health system in Thailand has meaningfully involved all stakeholders' participation and thereafter remained unchanged. In contrast, China's health system reform is characterized by a top-down approach with strong party control, resulting in less stakeholder participation. A comparison of the health system analysis between Thailand and China is summarized in Table 4.

Table 4 A summary of six building blocks of health system between Thailand and China

Indicators of six building blocks	Thailand	China
Health Resources	Scarcer	More
Health financing	Less	More
Service Delivery	Efficient	Relatively wasteful
Health information system	Seamless	Fragmented
Access to medical products, vaccines, technology	Yes	Yes
Leadership/governance	All stakeholders' participation	Political/Administrative leadership

Health System Responses to a Public Health Crisis in Thailand and China

During the COVID-19 pandemic, the importance of health system capabilities and governance in responding to global health crises becomes evident. Thailand, ranked 5th globally in the 2021 Global Health Security (GHS) Index, demonstrated effective health system readiness with a score of 68.2, surpassing China, which ranked 52nd with a score of 47.5. (Nuclear Threat Initiative et al., 2021). Thailand's success in containing COVID-19 can be attributed to universal access to healthcare, widespread public health facilities, and the involvement of village health volunteers (Narkvichien, 2020; Saechang, 2021). During the initial stage when vaccines are not yet available, both countries adhered to the WHO operational guidelines from February 2021 to January 2022, focusing on 4 key public health and social measures to address the pandemic, with China implementing them more rigorously (World Health Organization, 2021). These measures are suppressing transmission, reducing exposure, protecting the vulnerable, and reducing mortality and morbidity from all causes, and saving lives.

To suppress the transmission, Thailand employed various measures to suppress COVID-19 transmission, including testing, contact tracing, and quarantine, with lockdowns used as a primary strategy. It implemented a nationwide lockdown in April 2020 and a softer version from July to August 2021 during a surge in cases. Research indicated that vaccines could offer results comparable to soft-lockdowns, with an earlier lockdown potentially reducing transmission by 15% to 19.6% (Polwiang, 2023). While lockdown measures were gradually eased after July 2021, they played a significant role in controlling the spread of the virus. In contrast, China adopted a stringent approach, swiftly imposing complete lockdowns and mass testing in cities following outbreak reports within 24 hours. For instance, Wuhan

City in Hubei province underwent a comprehensive lockdown from January to April 2020. Other cities like Shenzhen, Guangzhou, and Shanghai also implemented varying durations of lockdowns to contain outbreaks, ranging from 5-60 days. China's zero-COVID strategy entailed frequent lockdowns as a norm, complemented by mandatory 48-hour testing for those leaving affected areas. The country's quarantine system was notably rigorous, with returnees subjected to a 14-day state quarantine, followed by a 7-day home quarantine and an additional 7-day monitoring period (known as the 14+7+7 system). China's proactive contact tracing efforts and swift lockdown responses were instrumental in curbing the spread of the virus effectively.

Secondly, Thailand focused on reducing virus exposure through community engagement, emphasizing mask-wearing, hand hygiene, physical distancing, and crowd avoidance. Public compliance was high due to trust in healthcare professionals and active communication by village health volunteers (Narkvichien, 2020; Saechang et al., 2021). Additionally, Thailand developed applications such as "Thai Chana" and "Mor Prom" to monitor people's movements and health status, although these initiatives were largely unsuccessful. In comparison, China implemented similar protective measures, including mask-wearing, hand hygiene, and social distancing, along with innovative strategies that leveraged its strong administrative capacity and digital technologies. China utilized digital tools like health codes on super-apps Alipay and WeChat to effectively manage risk groups. These color-coded health codes facilitated safe travel by indicating testing requirements and risk levels. Daily self-health checks were mandatory in China to maintain a green health code for unrestricted movement. If the code turned yellow, individuals were considered high-risk and advised to get tested and avoid going out. Turning red indicated that one should get tested and stay at home. Digital technologies played a significant role in contact tracing and exposure reduction, contributing to the success of China's pandemic control efforts until the shift away from the zero-COVID strategy in December 2022.

Next, Thailand prioritizes safeguarding the vulnerable through robust vaccine acceptance initiatives and rapid vaccination campaigns, including the implementation of diverse vaccine combinations based on available data and supplies. By March 2023, the vaccination coverage in Thailand significantly increased from 9.67% in August 2021 to 82.8% for the first dose, 77.8% for the second dose, and 39.3% for the third dose, with five different vaccine options in use (Sinovac, AstraZeneca, Sinopharm, Pfizer, and Moderna) (Department of Disease control, 2023). Similarly, China emphasizes its vaccination efforts and swiftly rolls out nationwide programs. As of August 2021, 79.1% of the Chinese population had been fully vaccinated (Zheng et al., 2021). It also has a higher vaccination rate per population at 239.03 compared to Thailand's 199.54. (World Health Organization, 2023c). While China predominantly relies on domestically produced vaccines such as

Sinovac and Sinopharm, it demonstrates the ability to inoculate its population at a faster pace.

Finally, Thailand and China have successfully reduced mortality rates and saved lives during the COVID-19 pandemic, with global mortality standing at 0.009%. Over the past three years, Thailand has recorded a mortality rate of 0.007% and China 0.001%, both lower than the global average. This discrepancy underpins China's adoption of a zero-COVID policy.

To conclude, both countries have adhered to the four key measures outlined by the WHO, with China demonstrating a more robust implementation of these strategies. While both nations have employed traditional public health crisis management tactics, Thailand has excelled in efficiently utilizing limited resources, including personnel and funding, through the deployment of village health volunteers. In contrast, China has implemented stringent prevention and control measures, leveraging its strong administrative capacity to mobilize health resources and finances for widespread testing. Additionally, China has embraced digital technology as an innovative tool in executing its zero-COVID policy

Governance Responses to a Public Health Crisis in Thailand and China

In the absence of widespread vaccine availability, lockdown policies are typically implemented. However, once vaccines become accessible, countries may choose between two approaches: Thailand's coexistence strategy and China's zero-COVID strategy. These differing responses stem from variations in their health systems. Thailand, leveraging its robust primary healthcare system, pursued a "Coexistence with COVID-19" policy, while China, with a more fragmented system, opted for a stringent "Zero-COVID" approach. A resilient health system, encompassing the six building blocks identified by the WHO—health workforce, health financing, service delivery, information systems, access to medical products, and governance—is crucial for effective public health crisis management. This includes considerations of health system responses, governance responses involving administrative capacity, utilization of traditional and innovative measures, the impact of political structures, economic factors, and public trust and compliance.

Strong administrative capacities are evident in both countries; however, China's ability to implement policies efficiently surpasses that of Thailand. China's success can be attributed to its adept integration of both traditional and innovative measures, supported by a robust digital surveillance infrastructure established prior to the pandemic. Traditional measures employed in China include stringent community lockdowns, inter-provincial resource mobilization efforts, and even leadership changes at the top. On the other hand, innovative strategies involve leveraging new technologies like health code monitoring and sophisticated big data analysis, alongside active community participation (Mei, 2022). The Chinese government's robust administrative capacity enabled the successful execution of a

three-year zero-COVID strategy, with policy responses adapting to the evolving pandemic landscape. During the initial outbreak phase, health system responses predominated, transitioning to greater reliance on economic tools as the crisis progressed and stabilized and eventually eased (Jiang & Yu, 2020). Notably, the frequency of central government interventions decreased as the crisis eased. The initial response to the pandemic in Wuhan was swiftly followed by centralized management directives from the central government, which were then cascaded down to local authorities for implementation (Liu & Saltman, 2020). This hierarchical approach ensured coordinated efforts in executing the three-year zero-COVID strategy. China's comprehensive approach encompassed a blend of traditional measures, such as strict lockdowns and resource mobilization, and forward-thinking strategies like technological innovations and community engagement (Cheng et al., 2020; Mei, 2020). It is the synergy of these traditional and innovative measures, underpinned by China's robust administrative capabilities, that enabled the successful implementation of the zero-COVID strategy.

Distinct political structures and governance frameworks contribute to varied levels of policy implementation and preferences. In Thailand, economic considerations, particularly the significant reliance on the tourism and service sector, have influenced the adoption of a coexistence strategy. Reopening to international tourism commenced in July 2021 through initiatives like the "Phuket Sandbox" program, gradually reducing quarantine durations from 14 days to 10 days and implementing policies such as "test and go" for approved countries. Additionally, Thailand utilized targeted measures like venue closures, lockdowns, and prioritized vaccination for certain groups. By July 2022, Thailand fully reopened to international tourism, culminating in the termination of the nationwide COVID-19 Emergency Decree on September 30, 2022, which had been renewed 19 times since March 25, 2020 (TAT News, 2022). As of October 2022, international travelers are no longer required to present ATK proof for entry. Preceding the pandemic, the Thai public had already adopted preventive measures such as mask-wearing due to seasonal haze conditions. Despite relatively low public trust in the government, trust in healthcare professionals plays a crucial role in mediating public trust and compliance with government measures during the pandemic response (Saechang et al., 2021).

On the contrary, the Chinese Communist Party (CPC) places a strong emphasis on social stability, considering it a top priority in governance. The Chinese political framework is characterized by a unique party-state dichotomy, where the CPC governs both society and the administrative system (Shambaugh 2008). Party officials play crucial roles in the administrative hierarchy and are responsible for policy implementation. The CPC's leadership establishes the ideology, principles, and guidelines followed by the entire administrative system. For instance, the zero-COVID policy, initiated by the central government, mandates

strict adherence across all levels of governance, irrespective of timing or location. In the event of a confirmed case, entire cities are placed under lockdown as a preventive measure. This approach aims to prevent potential citizen deaths that could trigger protests and social unrest, which the party leadership views with zero tolerance. Consequently, the public generally complies with government directives due to the authoritative governance in place.

Interestingly, public trust in the central government surpasses that of local governments in China, thereby legitimizing policies like the zero-COVID strategy endorsed by the central authorities. When the implementation of such policies falters at the local level, blame is attributed to the local government; however, successes are credited to the central government. The relatively high level of public trust in China sustained the zero-COVID policy, characterized by mass testing, lockdowns, and vaccination efforts spanning from March 2020 to December 2022. Despite initial support, challenges emerged as the public began to question the prolonged policy implementation. Various incidents, such as the Quarantine bus crash in Guizhou province, protests in Shenzhen demanding an end to lockdowns, and other social disruptions like the Beijing bridge protest and lockdown of 30,000 Foxconn industry employees in Guangzhou, raised concerns. These events, coupled with occurrences like the Maskless World Cup kickoff and the Urumqi fire resulting from lockdown measures, intensified public dissatisfaction (Lee, 2022). These social protests are quite unusual in China, thus worrying the authorities and undermining their policy legitimacy. Finally, China ended health codes monitoring and mass testing on 13 December 2022 and fully opened its country again on January 2023.

In summary, several factors of governance capacity play a pivotal role in shaping the adopted policy responses. These factors encompass the administrative system's ability to execute policies, the types of policies—both traditional and non-traditional—being considered, the primacy of the political system, economic considerations, and the levels of public trust and compliance with policies during times of crisis. Collectively, these elements influenced the preference for a coexistence strategy in Thailand and a zero-COVID strategy in China which Thailand opted to reopen its borders one and a half years ahead of China.

Discussion

Using the six building blocks of health system analysis, one can partially explain why China implemented the World Health Organization (WHO) guidelines for combating COVID-19 more rigorously. Despite having a stronger health system, Thailand has fewer health resources and less financing, yet it is able to deliver services more efficiently and effectively than China. Thailand's health information system is relatively integrated, providing easy access to vaccines and robust participation from all stakeholders, especially village health volunteers, who act as key agents in supporting the health system during crises. In contrast, China, despite having a larger ratio of health resources and financing, provides

services that are often deemed disproportionate and wasteful. Due to the complexity and scale of its health system, China's information system is relatively fragmented. However, China excels in providing medical products, vaccines, and technology, and demonstrates strong political and administrative leadership in the governance of its health system. Although both nations implemented public health and social measures to tackle COVID-19, China did so more stringently due to its more abundant health resources, financing, and strong leadership. Conversely, Thailand could not implement mass testing of suspected populations or sustain long-term lockdowns due to its limited health resources and financing.

In addition to the strength of the health system and responses from the health system, governance capacity is a crucial factor in determining policy paths. Thailand opted for a co-existence policy due to its limited administrative capacity, reliance on non-traditional measures, economic considerations, and the political landscape affecting public trust and compliance. Tourism and service industry, a key income source for Thailand, necessitates a balance between public health and economic needs. Although decision-making in Thailand is somewhat centralized, the government considers the concerns of all stakeholders. Moreover, the Thai public generally adheres to protective measures introduced by the government. Despite relatively low public trust in a government perceived as non-democratic at the time, professional trust mediates public trust in the government, fostering a higher level of policy compliance.

China, in contrast, despite having a weaker health system, possesses more abundant health resources and financing, robust governance capacity, including administrative prowess, traditional and innovative measures, an authoritative political structure, and a high level of public trust and compliance. The hierarchical and authoritative nature of China's political system enabled the implementation of a nearly three-year zero-COVID policy, allowing rapid policy adherence and resource mobilization across administrative organs. This included mass testing, strict and immediate lockdowns, and swift vaccination campaigns. Additionally, China employed digital surveillance and technology to monitor and control virus spread through health codes on smartphones, which tracked movement and health status. Big-data analysis was then applied to restrict movement and implement relevant measures efficiently.

Although the Chinese Communist Party (CPC) aims to foster economic development and social stability, the latter becomes a priority during times of uncertainty to legitimize its rule. Importantly, the public maintains a high level of trust in the central government, which initiates policies, despite lower trust in local governments that implement them. Regardless of the effectiveness of the zero-COVID policy, public perception deemed it legitimate. However, social protests and declining public trust in September 2022 eventually led to the abandonment of the zero-COVID policy by the end of that year.

Ultimately, the distinct socio-political landscapes and governance capacities of Thailand and China led to divergent policy responses in addressing the COVID-19 crisis.

Conclusion

In conclusion, the rationale behind the policy preference for a coexistence strategy or a zero-COVID policy is rooted in the strength of the respective health systems and their responses, with governance capacity playing a critical role during public health crises. Thailand, facing a scarcity of health resources, cannot afford large-scale lockdowns or mass testing. Instead, it relies on universal health coverage, readily accessible health facilities, and robust community engagement from village health volunteers to mitigate COVID-19 effectively. Once vaccines became available, Thailand employed both traditional and non-traditional measures to manage the pandemic. Balancing public health and economic considerations, coupled with high levels of public trust and compliance, enabled Thailand to gradually reopen in July 2021 and experiment with various policy interventions before fully reopening in October 2022.

China, on the other hand, applied a stringent implementation of the WHO's operational guidelines. Despite a weaker health system, China possesses more health resources and financing, along with a stronger governance capacity to respond to public health crises. With a higher vaccination ratio, China maintained its zero-COVID policy through a mix of traditional and non-traditional measures. Despite differing policy responses, both countries achieved satisfactory outcomes with low fatality rates and high vaccination levels. Ultimately, these successful measures have benefited the populations of both countries and offer valuable lessons for other nations in managing global health crises.

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