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**Compatibilities and Challenges of
Crisis Management in China—
An Empirical Study of Shanghai Lockdown**

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Abstract:

As the most severe public health crisis in recent decades, the aftermath of the COVID-19 pandemic negatively impacted worldwide. Crisis management strategies in response to this epidemic vary from country to country. China, pursuing the zero-COVID policy during this crisis, caused constantly debated. Prior studies have focused on the justification of the zero-COVID strategy and its political implication in China. Yet, limited attention has been given to examining the function of Chinese institutional features in implementing the policy. This article bridged the gap by recapitulating the framework of China's institutional system and analyzing its compatibility in pursuing the zero-COVID strategy, using the 2022 Shanghai lockdown as the case study. While answering the question of what might be advantages of China in implementing the virus elimination approach during the pandemic, this research concludes that China's centralized and hierarchical institutional structure enhances the effectiveness and swiftness of policy enactment and consolidated mobilization during the Shanghai lockdown. In addition, China's highly pervasive community-level institutional system facilitates effective communication between the government and the public, as well as helps practice the regulation in achieving the zero-COVID goal under the Shanghai case. Besides the structural analysis, this research also demonstrates potential difficulties and complications that the virus elimination principles might face in China. Through reviewing the characteristics of the current prevalent Omicron variant, the results showed that its rapid spreading speed, concealing property, and more extended activity on inanimate objects would be factors that challenge the patience and resolution of the public in reacting to the zero-COVID policy. These findings provide a more dynamic perspective to further crisis management research.

Keywords: Crisis management, zero-COVID strategy, Centralized institutional structure, Community-level institutional system

Introduction

Crises, such as war, disease, and natural disasters, often pose grave and unforeseen threats to the operation of the state and its administrative apparatus. Effective crisis management and response, by definition, “the processes by which an organization deals with a crisis before, during, and after it has occurred¹,” are necessary for a nation’s governance. The ability to assess, understand and implement the appropriate strategy to solve the emergency issue is essential to crisis management.

Since the first case appeared in December 2019, COVID-19 has affected all countries and more than 570 million people around the world ², with a massive health and human tragedy and has been regarded as the most severe public health crisis in recent decades. Countries have established emergency management systems in different fields in response to this pandemic. In order to control the disease, two strategies have been widely adopted worldwide: elimination and mitigation. The elimination strategy concentrates on rapid containment and prevention actions against the pandemic, while the mitigation approach utilizes loose or relaxed measures to curb virus transmission and attain a local resource at the acceptable level ³.

China, the most outstanding country in pursuing the elimination strategy in COVID-19, also called the zero-COVID approach, has managed not only the initial outbreak in the city of Wuhan but also the subsequent turns in Beijing, Nanjing, and Shanghai. Related literature have described how China implemented the zero-COVID policy and placed the discussion on the

¹ Christensen, Tom, and Per Lægveid. “Crisis Management Capacity in Central Government: The Perceptions of Civil Servants in Norway.” *Societal Security and Crisis Management*, 2018, 225–43. https://doi.org/10.1007/978-3-319-92303-1_12.

² “Who Coronavirus (COVID-19) Dashboard.” World Health Organization. World Health Organization. Accessed July 28, 2022. <https://covid19.who.int/>.

³ Heymann, David L. “Control, Elimination, Eradication and Re-Emergence of Infectious Diseases: Getting the Message Right.” *Bulletin of the World Health Organization* 84, no. 2 (2006): 82–82. <https://doi.org/10.2471/blt.05.029512>.

justification of this strategy in China ⁴⁵⁶⁷. Past evidence showed that the Chinese authoritarian governmental regime provides the ability to sustain and manage multiple large-scale emergencies and disasters not limited to public health issues, including earthquakes, floods, industrial explosions, and infrastructure accidents⁸. However, there is a lack of articles analyzing the advantages of China's institutional systems in response to this pandemic management strategy, in this case, the zero-COVID policy. In other words, with the pandemic entering its third year, besides China, many countries are switching their COVID-19 response system from elimination to mitigation. It is thus worthwhile answering the question, "under the institutional perspective, what are the advantages that China has to implement the zero-COVID strategy as the pandemic management policy, and are there any potential challenges while attaining this strategy?" The research will answer these questions respectively by analyzing an empirical study of the 2022 Shanghai pandemic outbreak. In this article, the Chinese institutional structure will be discussed, and its potential compatibility will be proposed. Then the zero-COVID strategy will be explained in detail. News reports and primary pandemic data will be stated to derive the following argument: China's centralized and hierarchical bureaucratic institutional structure improves the effectiveness and swiftness of policy enactment and consolidated mobilization during the Shanghai lockdown. Moreover, China's highly pervasive community-level institutional system facilitates the communication between the government and the public and

⁴ "Why Is Mainland China Sticking with 'Zero-Covid' Policy?" IHS Markit, June 29, 2022. <https://ihsmarkit.com/research-analysis/why-mainland-china-sticking-zero-covid-policy.html>.

⁵ Sun, Yu, and Wilfred Yang Wang. "Governing with Health Code: Standardising China's Data Network Systems during COVID-19." Policy & Internet, 2022. <https://doi.org/10.1002/poi3.292>.

⁶ Huang, Yanzhong. "The Collateral Damage in China's Covid War." Foreign Affairs, June 27, 2022. <https://www.foreignaffairs.com/articles/china/2022-05-17/collateral-damage-chinas-covid-war>

⁷ "Op-Ed: The Catastrophic Success of China's Zero-Covid Policy." Los Angeles Times. Los Angeles Times, May 21, 2022. <https://www.latimes.com/opinion/story/2022-05-21/china-zero-covid-policy-shanghai-lockdowns>.

⁸ Sorace, C. P. (2017). Shaken Authority: China's Communist Party and the 2008 Sichuan Earthquake. <https://doi.org/10.7591/9781501708503>.

practices the regulation in achieving the zero-Covid strategy under the Shanghai case. However, it is also worthwhile to consider the complex characteristics of the virus, which will lead to potential challenges while attaining this strategy, which will be analyzed in the following.

Crisis Management and its Compatibility with the Chinese Institutional System

Institutional Feature in Crisis Management

Crisis management is a process that involves identifying, assessing, understanding, and coping with an emergency issue⁹. Life-threatening crises, such as the ongoing public health crisis, always require rapid response and consistent action under time pressure. Previous literature has argued the crucial features necessary for the government to manage emergencies effectively. Hart et al. believed that emergency response required more centralized decision-making because of the time pressure and high uncertainty¹⁰. It refers to the concentration of power with a form of a centralized government. By doing so, the adherent at every level of the institution is able to eliminate time-consuming policymaking, as well as uncertainty, so that they can achieve urgent decision-making and immediate response to manage crises.

On the other hand, a quality relationship between the public and the government is essential to effectively implement crisis management, especially under the structural arrangement and system performance¹¹. Trust building needs to be established through transparent communication. Karen et al. analyzed multiple public health crisis management methods, emphasizing that the local level and the non-governmental level (NGOs) can serve as

⁹ Avery Gomez, Elizabeth & Passerini, Katia & Hare, Karen. (2006). Public Health Crisis Management: Community Level Roles and Communication Options. Proceedings of ISCRAM 2006 - 3rd International Conference on Information Systems for Crisis Response and Management.

¹⁰ Hart, Paul, Uriel Rosenthal, and Alexander Kouzmin. "Crisis Decision Making." *Administration & Society* 25, no. 1 (1993): 12–45. <https://doi.org/10.1177/009539979302500102>.

¹¹ Quinn, S. C., Parmer, J., Freimuth, V. S., Hilyard, K. M., Musa, D., & Kim, K. H. (2013). Exploring communication, trust in government, and vaccination intention later in the 2009 H1N1 pandemic: Results of a national survey. *Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science*, 11(2), 96–106. <https://doi.org/10.1089/bsp.2012.0048>

front-line responders, enabling and facilitating the communication between the central government and the citizen. To summarize, past literatures argued that centralization and governance transparency in closely connecting highly localized government and citizens are two essential institutional features in effectively managing the crisis.

Chinese Institutional Structure Description

The Chinese state is characterized by several distinctive features. It is a hierarchical, highly centralized system comprised of pervasive community-level institutions. The Chinese political institution is organized in a strictly top-down fashion. The central party apparatus has the controlling power over the provincial governments, the provincial governments control the provinces and cities, and so on.¹² For professional politicians, their promotion is decided mainly by their direct superiors. For a limited number of around 2000 minister and vice-minister level cadres, their appointments are directed and controlled by the central leadership (*Zhong Guan Gan Bu*). The minister and vice-minister level cadres include the central officials of the provinces, such as the provincial party secretaries and the provincial governors.¹³ At the same time, important decisions, even on a provincial level, often must be relayed to the central government for approval before implementation. This hierarchy is a historically rooted feature: in the 1953 document "The Decision of the Chinese Communist Party Central on Strengthening Leadership of the Party Central in Governance and the Reporting to Central Leadership by Local Governments," the CCP central clearly states that "in order to prevent the loss of central leadership in everyday governance, future important government affairs must go through the

¹² Li, Y., Chandra, Y., & Kapucu, N. (2020). Crisis Coordination and the Role of Social Media in Response to COVID-19 in Wuhan, China. *Improving Communication Capacity & Credibility*, 50(6-7) 698–705.

¹³ Alpermann, Bjorn. (2009). "Institutionalizing village governance in China." *Journal of Contemporary China* 18(60), 397–409.

party central for approval or decision in a frequent and timely manner and may include other forms of the report such as meeting minutes, statistics, etc.”¹⁴

Besides the centralized and hierarchical bureaucratic structure, the Chinese political system is also characterized by the pervasiveness of community-level institutions. The basic units called street “街道 Jiedao” or communities “社区 Shequ” carry localized administrative functions such as distributing central propaganda, resolving disputes, etc. “Jiedao” and “Shequ” are similar to the concept of the non-profit organization in the US, but they are self-organized with civic engagement. In 2018, there were more than 8000 basic units. These basic units have leadership functions over the residential committees (居委会 Ju We Hui), which could effectively reach the individuals in a community¹⁵. Thus, there is a direct line of access for central directions to be implemented on an individual level.

According to the previous section, successful containment of the pandemic needs two factors: a unitary system regarding crisis management policymaking and support from the ground level or the public. Thus, it is essential to have both governing structures as an external driving force to make all people act consistently. From the institution and governing structure perspective, in theory, China’s institutional system has several advantages favorable to crisis management, such as pandemics control. On the one hand, the Chinese central leadership formed a swift and decisive policy to take charge, order lockdowns, and direct resources from all over the country to help the severely impacted location. Under the one-party leadership structure, to implement the zero-COVID policy, local governments in all provinces, cities, towns, districts, etc., will always follow the central government. The centralized control allowed China to give

¹⁴ Sullivan, L. (1986). Leadership and Authority in the Chinese Communist Party: Perspectives from the 1950s. *Pacific Affairs*, 59(4), 605-633. doi:10.2307/2758538

¹⁵ Yue Qian & Amy Hanser (2020): How did Wuhan residents cope with a 76-day lockdown?, *Chinese Sociological Review*

coherent guidance to all provinces, which is essential for crisis management and especially economic recovery in China.

On the other hand, the central commission both arranged and encouraged self-help between the provinces, which is a form of partner assistance strategy formerly applied to earthquake reconstruction or poverty alleviation. Thus, in addition to the swift actions, another potential advantage of the centralized institutional system in China may be the consistency and strong consensus between different institutions in any region. Hence, a hypothesis may be drawn as follow:

H1: The hierarchical and centralized institutional structure is compatible with the Shanghai zero-COVID strategy in pandemic management and facilitates its implementation.

Besides, the crisis management regime in China did not stop at the center but was extended layer by layer until reaching the ground level. The permeation of community-level bureaucratic establishments such as "Shequ" or "JieDao" could allow central policies to be actualized at the individual level, enhancing the feasibility of the zero-COVID approach, such as large-scale lockdowns. In a broader scope of crisis management, those ground-level officials can serve as front-line responders, enabling and facilitating communication between the central government and the public. "Jiedao" and "Shequ" are especially essential in the urban areas in China since they can effectively respond to and transmit the decisions of the local government to their residents. In the downstream direction from the government to the public, the idea of "Jiedao" and "Shequ" also played crucial roles, especially in tracing the social relationships of each COVID-19 positive case. During the Wuhan lockdown, almost all members of "Shequ" voluntarily worked at the gates of their community to check people's residency and test body temperature. Anyone with relating symptoms would be immediately reported to the local

government. Moreover, with the help of the community-level institution, the government could efficiently locate the specific “Jiedao” (neighborhood) and “Shequ” (community) of the patient. Since there is a high frequency of contact between residents in the same “Shequ,” the information about where the patient moved and whom the patient met recently would be easy to collect. The pandemic in Wuhan was able to be effectively contained because of the high accordance between the government and the local community. In this way, along with the result from Karen et al., the second hypothesis can be proposed as follows:

H2: The pervasive community-level institutional structure (Jiedao and Shequ) is compatible with the Shanghai zero-COVID strategy implementation in pandemic management.

However, despite the well-structured institution of a country, uncertainty and time pressure usually bring potential threats during crisis management. The current global public health crisis is a complex and long-lasting issue¹⁶. It is also essential to understand what challenges China may face during the COVID-19 management in pursuing the zero-COVID policy. Thus, the research question raised:

From the case of Shanghai implementing the zero-COVID strategy in pandemic management, what potential challenge did the Chinese government face?

The following article will use the 2022 Shanghai COVID-19 outbreak as an empirical study to testify the above hypotheses while answering the research question. As the public health crisis management measure, the zero-COVID strategy will be described in detail, and the news reported in Shanghai during the epidemic will be analyzed.

Virus Elimination and Zero COVID Strategy

¹⁶ Burkle Jr., Frederick M. “Challenges of Global Public Health Emergencies: Development of a Health-Crisis Management Framework.” *The Tohoku Journal of Experimental Medicine* 249, no. 1 (2019): 33–41. <https://doi.org/10.1620/tjem.249.33>.

Before analyzing the Shanghai outbreak, it is essential to understand the zero-COVID strategy and how China utilizes different measures to implement this policy. Epidemiologists differentiated two methods, which have been widely adopted to control the COVID-19 pandemic as mitigation and elimination¹⁷. Mitigation strategies, commonly called "living with the virus," aim to decrease the epidemic's growth and prevent the healthcare system from being overburdened but still obtaining a level of continued viral transmission within the community. Elimination strategies, by contrast, typically known as the "zero-COVID" strategy, aim to completely control the spread of the virus within the community to allow the resumption of normal daily social and economic activities¹⁸. In other words, mitigation aims to enable society to curb the pandemic smoothly, and elimination focuses on immediate containment and maximum prevention actions against the pandemic.

Zero-COVID approach as a public health policy trying to eliminate the spread of the virus has been utilized in a variety of degrees by many countries since the COVID-19 pandemic occurred, including China, Australia, New Zealand, South Korea, North Korea, Atlantic and Northern Canada, Bhutan, Singapore, Scotland, Tonga, and Vietnam¹⁹. This approach contains two stages in implementation: an initial suppression stage that requires the virus elimination, which locally uses aggressive public health measures, and a sustained containment stage that uses the public health measures to contain new outbreaks before they widely spread²⁰. Thus, after

¹⁷ --Li, Zhongjie; et al., (4 June 2020). "Active case finding with case management: the key to tackling the COVID-19 pandemic". *The Lancet*. 396 (10243): 63–70. doi:10.1016/S0140-6736(20)31278-2. PMC 7272157. PMID 32505220.

--Baker, Michael G; Kvalsvig, Amanda; Verrall, Ayesha J (13 August 2020). "New Zealand's COVID-19 elimination strategy". *The Medical Journal of Australia*. 213 (5): 198–200.e1. doi:10.5694/mja2.50735. PMC 7436486. PMID 32789868.

¹⁸ "Impact of non-pharmaceutical interventions (NPIs) to reduce COVID19 mortality and healthcare demand" (PDF). Imperial College COVID-19 Response Team. 16 March 2020.

¹⁹ World Health Organization. Global Framework for Multi-Disease Elimination. 2020. Available online: <https://www.who.int/docs/default-source/ntds/leprosy/global-consultation-on-global-leprosy-strategy-2021-2030/08-global-framework-multi-disease-elimination.pdf> (accessed on 7 October 2021).

²⁰ Su, Z.; Cheshmehzangi, A.; McDonnell, D.; Ahmad, J.; Šegalo, S.; Xiang, Y.-T.; da Veiga, C.P. The Advantages of the Zero-COVID-19 Strategy. *Int. J. Environ. Res. Public Health* 2022, 19, 8767. <https://doi.org/10.3390/ijerph19148767>

broad managing the outbreak from a region, zero-COVID strategies require stricter controls to prevent the reintroduction of the virus, more rapid identification of new outbreaks, and better contact tracing to end recent outbreaks swiftly. The containment measures are usually described as lockdowns, quarantine for travelers, regular tracing and isolating the infected patient, routine testing of the critical population, and implementation of community-wide screening²¹. Different measures are used both during the initial containment phase to eliminate the virus and the sustained phase.

Mainland China (I will use China for convenience) has pursued the zero-COVID policy since the pandemic started, believing that the community can dynamically eliminate the virus. The China CDC COVID-19 Emergency Response Team clarified the elimination strategy to contain new outbreaks, including but not limited to aggressive contact tracing, isolation of infected people, quarantine of their close contacts, large-scale nucleic acid testing, and domestic travel restrictions from high-risk areas. If the situation becomes severe, a city-wide lockdown will be enacted²². Based on a review of the news reports and the policy regulations, the below defines and describes how four containment measures are utilized nationwide in China to implement the zero-COVID strategy.

Lockdowns:

Lockdown is usually a measure of implementing the strict Stay-at-Home order for citizens, accompanying with closure the non-essential business to achieve the initial containment of the virus. In China, a city or community-wide lockdown is often used to suppress the potential outbreak. During the initial COVID outbreak in Wuhan, the government enacted a city lockdown

²¹ Chen, Qiulan (2 December 2021). "Rapid and sustained containment of covid-19 is achievable and worthwhile: implications for pandemic response". *The BMJ*. 375: e066169. doi:10.1136/BMJ-2021-066169. PMC 8634366. PMID 34852997.

²² <https://www.chinacdc.cn/en/.report>, 2020.

that lasted 76 days to avoid the epidemic nationally, limiting it to a single geographical area, preventing a potential 67 times as many patient infections²³. Data showed that 4.4% of Wuhan's population had been infected during the wave. Before 2021, the infection number outside lockdown areas was too small to measure in the representative sample²⁴. Evidence showed the effectiveness of lockdowns in the containment of the virus spreading to eliminate COVID-19.

Travel Restriction and Quarantine for Travelers:

Travel restriction, aiming to prevent imported infection into the zero-COVID regions, which will cause community transmission and eradicate the initial success of containment, is enforced in the form of quarantine for incoming travelers. China implemented COVID-19 border control by issuing air travel regulations and destination-specific restrictions. The regulation will be varied by departure countries of travelers. Take China's COVID-19-related restriction on U.S travelers as an example. As of now, U.S travelers to China must complete PCR negative and IgM antibody tests at the designated agency in the departure city within 48 hours²⁵. All travelers must prepare for quarantine at the government-designated location for a minimum of 7 days upon the arrival. During the quarantine, travelers cannot leave their rooms and will be received the daily COVID-19 tests by medical personnel. People who test positive will be transferred to the government-designated medical facility²⁶. During the quarantine, standard care and accommodation will be provided²⁷. After completing quarantine upon arrival, travelers will need

²³ Lai S, Ruktanonchai NW, Zhou L, et al.. Effect of non-pharmaceutical interventions to contain COVID-19 in China. *Nature* 2020;585:410-3. 10.1038/s41586-020-2293-x [PMC free article] [PubMed] [CrossRef] [Google Scholar]

²⁴ Li Z, Guan X, Mao N, et al.. Antibody seroprevalence in the epicenter Wuhan, Hubei, and six selected provinces after containment of the first epidemic wave of COVID-19 in China. *Lancet Reg Health West Pac* 2021;8:100094. 10.1016/j.lanwpc.2021.100094. [PMC free article] [PubMed] [CrossRef] [Google Scholar]

²⁵ “自底特律离美赴华航班乘客行前检测具体安排。” 中国驻芝加哥总领事馆. Consulate-General of the People's Republic of China in Chicago. Accessed July 30, 2022. http://chicago.china-consulate.gov.cn/chn/zytz/202201/t20220105_10478976.htm.

²⁶ 中华人民共和国驻芝加哥总领事馆. Accessed July 30, 2022. <http://chicago.china-consulate.gov.cn/>.

²⁷ China, U.S. Mission. “Covid-19 Information.” U.S. Embassy & Consulates in China, July 18, 2022. <https://china.usembassy-china.org.cn/covid-19-information/>.

the additional three days of self-quarantines and mandatory tests when entering their community. High-volume international ports have established health centers to quarantine people entering and leaving, providing better disease management to minimize secondary transmission risk to achieve the zero-COVID policy²⁸.

Contact Tracing and Isolating:

Contact tracing is used to locate the people who have been contacted with infected patients or exposed to high-risk areas. In China, if people are diagnosed with COVID-19, they will be immediately isolated from the community through being either quarantined at home or brought to the designated hospital for treatment. Then their social activity and close contact are required to be reported. Once the trace has been spotted, the closely contacted person will be monitored and quarantined until they are frequently tested and show negative results²⁹. In other words, this approach is to enact the isolation of the infected individual and quarantine the closely contacted person who may be infected. Various research argues that early detection, isolation, and quarantine are the most effective measure for preventing the transmission of the virus, facilitating pandemic control^{30,31,32}.

Currently, digital contact tracing, along with the widespread use of the smartphone, has become the norm. In China, the "health QR code" applications (also called “Jian Kang Ma 健康码” in Chinese) are used to record the trace of people and identify close contact³³. Every resident

²⁸ Chen, Qiulan (December 2 2021). “Rapid and sustained containment of covid-19 is achievable and worthwhile: implications for pandemic response”. The BMJ. 375: e066169. doi:10.1136/BMJ-2021-066169. PMC 8634366. PMID 34852997.

²⁹ "What is the difference between isolation and quarantine?". HHS.gov. 9 February 2015. Retrieved 27 March 2022.

³⁰ Liu F, Zheng C, Wang L, et al.. Interpretation of the protocol for prevention and control of COVID-19 in China (edition 8). China CDC Wkly 2021;. 3:527-30. 10.46234/ccdcw2021.138.

³¹ Tian H, Liu Y, Li Y, et al.. An investigation of transmission control measures during the first 50 days of the COVID-19 epidemic in China. Science 2020;368:638-42. 10.1126/science.abb6105.

³² Bai L, Wang Y, Wang Y, Wu Y, Li N, Liu Z. Controlling COVID-19 transmission due to contaminated imported frozen food and food packaging. China CDC Wkly. 2021;3:30-3

³³ “防疫健康码 - MFA.” Accessed July 30, 2022. https://hr.cs.mfa.gov.cn/help_two/help-two/.

in China needs to obtain a health QR code to enter public facilities or travel across the province. It is an application installed on the phone that perpetually tracks the individual's movement and cross-checks it with the database's catalog of high risks areas. If an individual passes a high-risk area and the code turns red, the individual is ordered into quarantine; if the code is green, individuals could live their regular lives³⁴. Each individual in China is required to disclose all their movements in order to obtain a "green pass" in the system of health-QR-code.

Community-Wide Screening and Routine Testing:

Community-wide screening is a tool for massive COVID surveillance. The PCR test is mainly used in China in community screening to identify infected patients with or without symptoms during the pandemic. Routine testing of the key populations, such as people in high-risk areas and medical workers, is necessary as well. China implemented the community-wide screening from May 14 to June 1, 2020, in the initial outbreak in Wuhan and utilized this technique in the following outbreaks. City-wide PCR tests are able to identify a large percentage of patients. For example, about 22% in the July 2020 Dalian outbreak and 26% in the June 2020 Beijing outbreak were identified by the PCR tests³⁵. The screening provided the ability to rapidly isolate the infected people from the mass, serving as the necessity to allow a reopening of economic activity from lockdown during the implementation of the zero-COVID policy.

By utilizing the above short-term localized intense containment measures, China, pursuing the zero-COVID strategy, has managed multiple smaller outbreaks after the initial epidemic in Wuhan. In 2021, China successfully contained eleven outbreaks of the Delta variant,

³⁴ Meng, Zhong, Raymond; Krolik, Aaron. 中國推廣健康碼監控疫情 (Translation: China promotes health code to monitor epidemic). 纽约时报中文网. 2020-03-03

³⁵ Chen, Qiulan (2 December 2021). "Rapid and sustained containment of covid-19 is achievable and worthwhile: implications for pandemic response". *The BMJ*. 375: e066169. doi:10.1136/BMJ-2021-066169. PMC 8634366. PMID 34852997.

with a total of 1390 detected cases³⁶. The Nanjing epidemic on July 20, 2021, was the most significant imported case at that time and spread to multiple provinces before being contained. Even on such a large scale, by employing contact tracing, massive screening, and regular testing, the total infected population was 1162³⁷.

Since mid-February 2022, China nationwide has encountered an unprecedented wave of infections caused by the Omicron variant, with daily cases reaching more than thousands, at a level that has not been seen since the 2020 Wuhan outbreak³⁸. To fight against a new wave of the epidemic, China has deployed similar zero-COVID methods in some areas with lockdowns, such as in Shenyang and Shenzhen³⁹. Shanghai, in addition, where has previously adopted a lax approach to avoid massive social and economic dysfunction, significantly impacted by the Omicron variant of COVID-19. With the rapidly increasing cases, since March 28, Shanghai has urgently issued a city-wide lockdown to prevent the virus transmission⁴⁰. This lockdown has been considered the most extensive due to COVID-19 in China since Wuhan in early 2020.

Description of Shanghai Lockdown in Response to the Zero-COVID Policy

Shanghai, the most economically influential city in China with a population of almost 25 million, has always faced a high risk of imported COVID-19 cases. Since the COVID-19

³⁶ Zhou, Lei, Kai Nie, Hongting Zhao, Xiang Zhao, Bixiong Ye, Ji Wang, Cao Chen, et al. “Eleven Covid-19 Outbreaks with Local Transmissions Caused by the Imported SARS-COV-2 Delta Voc — China, July–August, 2021.” *China CDC*, no. 41 (2021): 863–68. <https://doi.org/10.46234/ccdcw2021.213>.

³⁷ Li, Zhongjie, Qiulan Chen, Luzhao Feng, Lance Rodewald, Yinyin Xia, Hailiang Yu, Ruochen Zhang, et al. “Active Case Finding with Case Management: The Key to Tackling the COVID-19 Pandemic.” *The Lancet* 396, no. 10243 (2020): 63–70. [https://doi.org/10.1016/s0140-6736\(20\)31278-2](https://doi.org/10.1016/s0140-6736(20)31278-2).

³⁸ Person. “China Reports 1,335 New COVID Cases for March 25 vs 1,366 a Day Earlier.” Reuters. Thomson Reuters, March 26, 2022. <https://www.reuters.com/world/china/china-reports-1335-new-covid-cases-march-25-vs-1366-day-earlier-2022-03-26/>.

³⁹ “China Locks Down City of 9 Million and Reports 4,000 Cases as Omicron Tests Zero-Covid Strategy.” *The Guardian*. Guardian News and Media, March 22, 2022. <https://www.theguardian.com/world/2022/mar/22/china-locks-down-city-of-9-million-and-reports-4000-cases-as-omicron-tests-zero-covid-strategy>.

⁴⁰ “Shanghai Covid: China Announces Largest City-Wide Lockdown.” BBC News. BBC, March 27, 2022. <https://www.bbc.com/news/world-asia-china-60893070>.

outbreak in 2020, the number of international inbound flights arriving in Shanghai occupied nearly 40% of the total, and its border transmission is the busiest among all cities in China⁴¹. As a result, even with the border control, Shanghai still obtained the most significant number of imported COVID-19 cases, which climbed to 4,345 as of March 2022, since the Omicron variant appeared⁴².

As the financial hub of China, Shanghai's economic status entitles this city to be more unrestricted during the pandemic. Until early March, Shanghai has always been regarded as the model of pandemic control that effectively contained no more than 25 cases for 12 outbreaks during two years⁴³. Before this outbreak, Shanghai continued with its loose COVID-19 controlling strategy since January 2020, that the primary containment method has all been community-based contact tracing and quarantine. Until late March 2022, Shanghai had not implemented strict zero-COVID measures such as massive lockdown, a wide range of mandatory COVID testing, or temporary quarantine locations to contain the virus⁴⁴. The consideration of this enactment is founded on the fear of eliminating international business opportunities and negatively impacting the economy in the national wide. In addition, the diverse constitution of Shanghai's residences also preferred a more loose and adaptive pandemic approach.

However, things started to change in February 2022, Hong Kong suffered from a new COVID-19 outbreak because of the increased population mobility due to the Chinese New Year

⁴¹ “Shanghai Neighborhoods Resubmit to Lockdown as Covid Cases Rebound.” Caixin Global. Accessed July 30, 2022. <https://www.caixinglobal.com/2022-07-27/shanghai-neighborhoods-resubmit-to-lockdown-as-covid-cases-rebound-101918622.html>.

⁴² Stv 新闻坊. “新华社解码魔都 | 上海战疫攻防格局, 请看十组数据.” 新华社解码魔都 | 上海战疫攻防格局, 请看十组数据|疫情|上海市|志愿者_新浪新闻, March 14, 2022. https://web.archive.org/web/20220401053302/https://k.sina.com.cn/article_1989020644_768e0be4019015518.html.

⁴³ Yang, Dali. “China’s Zero-COVID Campaign and the Body Politic.” Current History, September 2022.

⁴⁴ “上海应急响应级别由一级降为二级 京津冀鄂仍为一级.” caixin. Accessed July 30, 2022. <https://china.caixin.com/m/2020-03-23/101532512.html>.

traveling, reaching the highest number of positive cases in March⁴⁵. The worsened situation in Hong Kong directly gave rise to a significant boost in the positive cases in Shanghai due to frequent flights between those two cities⁴⁶. All diagnosed COVID-19 cases in Shanghai in March came from outside mainland China, and cases originating from Hong Kong composed over 75% of them⁴⁷. Therefore, starting in early March, many government officials and experts, including Dr. Wenhong Zhang, discussed and planned multiple policies in order to control the outbreak in Shanghai.

During the Politburo Standing Committee (PSC) meeting hosted on March 17, 2022, President Xi Jinping and the central government decided to insist on the zero-COVID policy in all areas with positive cases, especially increasing the restriction in Shanghai. Xi noted that every part of the Chinese institutional system, from provincial governments to local Jiedao and Shequ, must "spare no effort" to eliminate the positive COVID-19 cases⁴⁸. With this guidance, Shanghai has started to enforce various policies and prepared considerably to prevent the growing epidemic.

Buildings with high occupation, including stadiums and convention centers, were reconstructed in an emergency manner into quarantine centers and mobile-field ("Fangcang" 方舱医院) hospitals. With the support of enough medical supplies, including the quarantine centers and medical workers, Shanghai officials started the two-stage lockdown of the Pudong district

⁴⁵ 上海应急响应升级." caixin. Accessed July 30, 2022. <https://china.caixin.com/m/2020-03-23/101532512.html>.

⁴⁶ “第五波 40 日逾 2000 個案 「檢疫酒店」成歷來最大群組 - 20220206 - 要聞.” 明報新聞網 - 每日明報 daily news. Accessed July 30, 2022. <https://news.mingpao.com/pns>

⁴⁷ “滬疫情仍處快速上升期 外溢多省多市.” 香港文匯網. Accessed July 30, 2022. <https://www.wenweipo.com/a/202204/13/AP6255e3d3e4b036dce9a7341f.html>.

⁴⁸ 安德烈. “習近平堅決清零不回頭.” RFI. RFI - 法國國際廣播電台, March 18, 2022. <https://www.rfi.fr/tw/>.

and Puxi district alternatively, as well as the community-wide screening using the PCR test on March 28, 2022.⁴⁹ At this point, a strict pandemic control were enacted in Shanghai.

Validity Evaluation of Shanghai zero-COVID Strategy in Eliminating Virus Spreading

This section will evaluate whether Shanghai's zero-COVID strategy has effectively contained the virus spreading followed as the Chinese central government directed. The Shanghai outbreak differs from the past epidemic in China because most cases are caused by the Omicron variant of SARS-CoV-2. Thus, the zero-COVID policy includes two goals: containing the spread of the virus and detecting the infected people without symptoms by city-wide screening through mandatory COVID testing in Shanghai. To visualize the effectiveness of the policy implementation, I generated not only the graphs of the daily new confirmed diagnosed cases but also the tested positive cases without symptoms from March 1 and May 24, 2022, using the data from the National Health Commission (NHC)⁵⁰.

⁴⁹ 财联社. “上海举行全市领导干部大会 对疫情防控再动员再部署再落实.” 新冠肺炎_新浪财经_新浪网, March 30, 2022. <https://finance.sina.com.cn/china/gncj/2022-03-30/doc-imcwipii1501415.shtml>.

⁵⁰ National Health Commission of the PRC. Accessed July 30, 2022. <http://en.nhc.gov.cn/>.

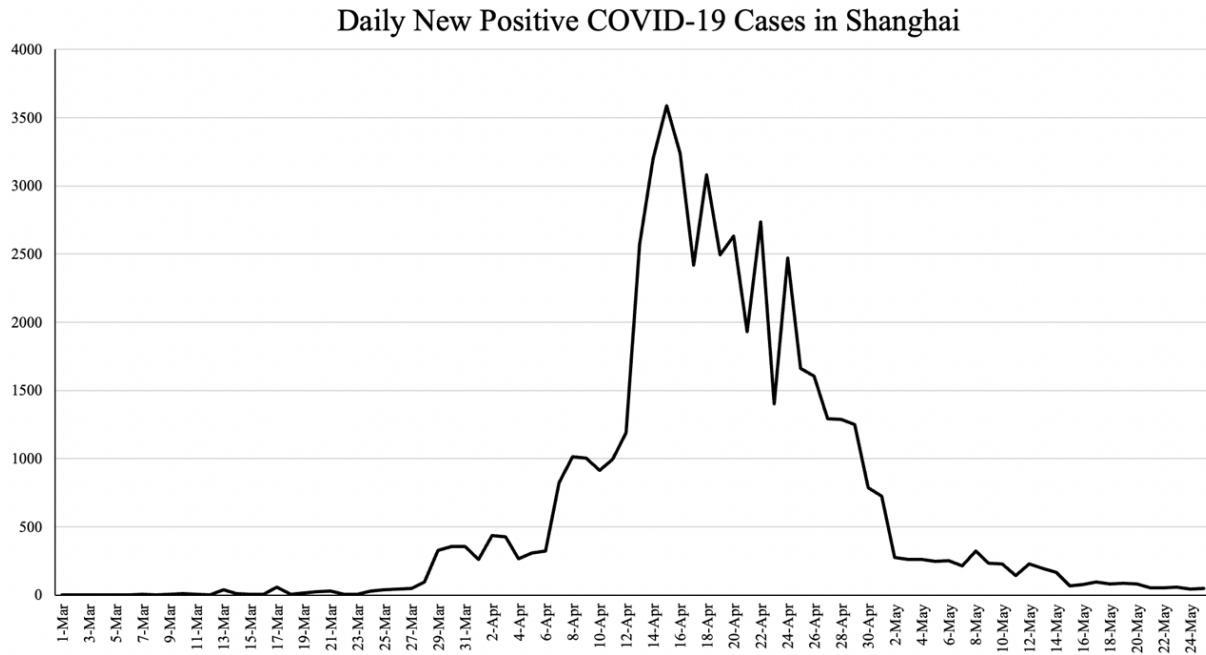


Figure 1: Graph of daily new confirmed positive cases

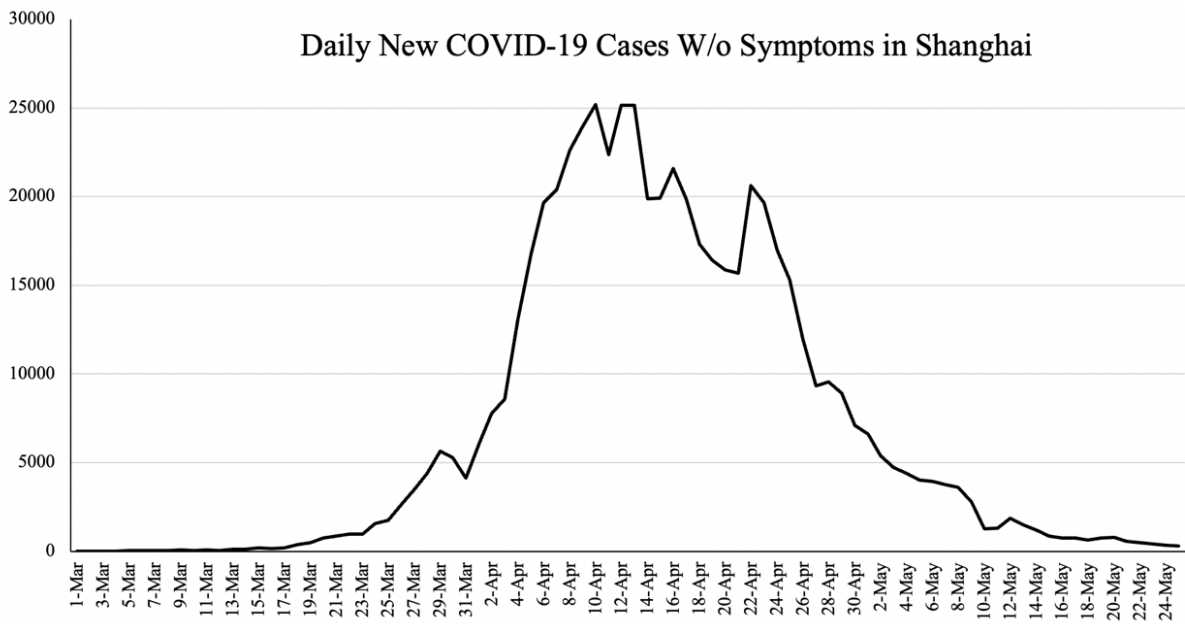


Figure 2 Graph of daily new positive cases without symptoms

Figures 1 and 2 indicate that on each day during the outbreak, the number of positive cases without symptoms was almost ten times larger than the confirmed positive cases with symptoms. This tendency demonstrated the substantial, heavy burden on controlling the pandemic since those infected people without symptoms are much more challenging to detect.

Besides the overall trend, the peak of both daily newly diagnosed positive cases and the daily asymptomatic confirmed cases appeared in mid-April, approximately ten days after the initial implementation of the zero-COVID policy (March 28). The actual peaks of the outbreak are hard to determine because, before March 28, 2022, Shanghai had not implemented any strict and city-wide lockdown and did not implement city-wide mandatory COVID testing, where they only quarantined people with symptoms and voluntarily reported to the hospital. In this way, the assumption can be made that many positive cases may have already existed before March 28 without being documented by the NHC, and the data collected may have a time lag with the actual number counted. Thus, the early reported cases of the outbreak stand as a more referential matter compared with the data after mid-April, when a city-wide COVID test was implemented, and the report system was well established in Shanghai. With its accurate attributes, cases recorded after mid-April showed a significant decrease in infection both with and without symptoms. Accordingly, it directly confirms the effectiveness of implementing the zero-COVID policy in Shanghai. In addition, the fact that there was more non-symptom case in this outbreak and the concealing nature of the Omicron variant implies the difficulty of controlling, which further proves the effectiveness of the zero-COVID policy in eliminating the virus transmission in Shanghai. After mid-May, both confirmed positive cases and cases without symptoms decreased to the zero level dynamically, reaffirming the validation of the zero-COVID strategy in eliminating the virus spreading in Shanghai.

Centralized Institutional Structure Facilitates the Zero-COVID Policy Response

The above sections explained what the zero-COVID strategy is and acknowledged that this policy indeed plays a decisive role in preventing virus transmission. From the process of the Shanghai lockdown, the following section will demonstrate that the success of this strategy implementation is supported by China’s centralized institutional structure. The first advantage is that the Chinese centralized and hierarchical structure enabled swift and decisive policy enactment as well as preparation, providing effectiveness during a timely matter public health crisis. The timeline of the policy execution of this outbreak can be summarized as follows.



Shanghai COVID-19 Outbreak Timeline⁵¹

⁵¹ From shanghai Municipal Health Commission report.

From the timeline, we can see that until mid-March 2022, Shanghai still employed the lax COVID-19 response. On March 16-17, Shanghai officials implemented the "grid-style screening" in the high-risk area instead of a citywide lockdown⁵². The PCR test was used to screen infection cases. Contact tracing and isolating would be enacted when tested positive. However, with the rapid increase of the COVID-19 positive cases after the Politburo Standing Committee (PSC) meeting hosted on March 17, 2022, the central government and President Xi decided to insist on and devote significant effort to the Zero-COVID policy across the nation⁵³. Shanghai government immediately responded and started preparation. Evidence showed that in only 10 days, on March 28, Shanghai swiftly reacted to and followed the central government's resolution by implementing the citywide lockdown and daily mandatory COVID testing. The Shanghai government has started the preparation from municipal to local, including constructing quarantine centers, starting massive COVID testing, and establishing medical teams. In this way, the well-structured hierarchical and centralized system provides the capability of immediate policy response.

On the other hand, the centralized institutional system enabled solid and cohesive efforts in preparing and enacting the policy within citywide and nationally. During the outbreak, the Shanghai government coordinated extensive financial and labor resources in the municipality, and the central government also advocated and reallocated the efforts nationwide to support Shanghai, increasing the efficiency in the policy execution, which is essential in public health crisis management. For example, the reconstruction of the Shanghai New International Expo Centre (SNIEC) only took six days, starting on March 25, and was ready to use on March 31, turning an expo center with a total area of 200,000 square meters into a

⁵² Yang, Dali. "China's Zero-COVID Campaign and the Body Politic." *Current History*, September 2022.

⁵³ 安德烈. "習近平堅決清零不回頭." RFI. RFI - 法國國際廣播電台, March 18, 2022. <https://www.rfi.fr/tw/>.

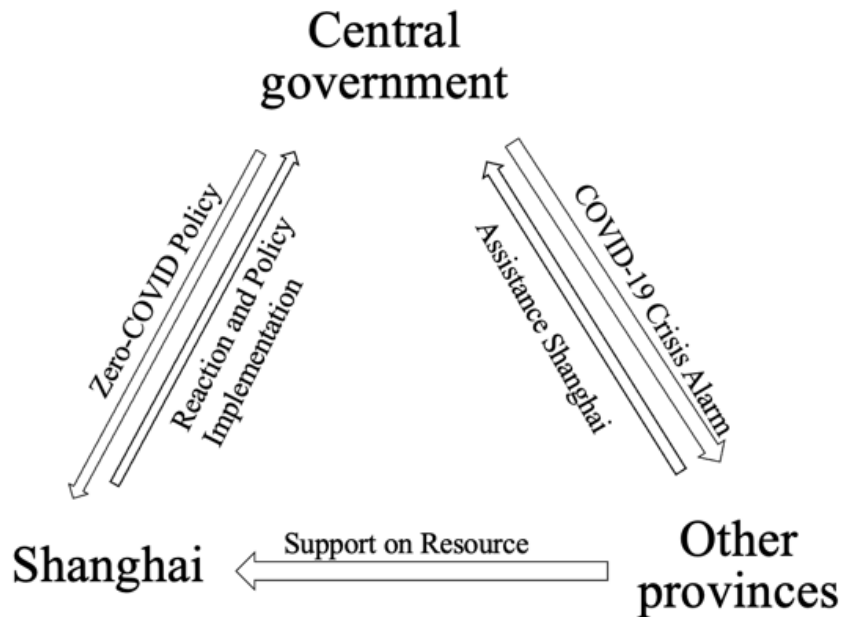
mobile-field hospital containing 15,000 beds. The speed of reconstructing such a large building is supported by the 6000 workers that the government acquired, divided into day and night shifts, to work 24/7 continuously⁵⁴. Some of those workers might have been working on other projects at that time, but because the municipal government defines the reconstruction of SNIEC as the most emergency and crucial task in managing this public health crisis, the local business will then, in response to temporarily shut down the unnecessary construction project and redeploy those workers into the SNIEC. Moreover, the coordination is not only within this city. The central government also encourages other provinces to support Shanghai in response to this pandemic crisis. Medical teams, including over 38,000 doctors and nurses from 15 different provinces in China, were compelled to assist and provide medical services in quarantine centers and mobile-field hospitals⁵⁵. The citywide screening and daily PCR test require a massive amount of trained personnel. In order to realize this requirement, National Health Commission (NHC) gathered an enormous amount of various support from other provinces in China, including 2.4 million pieces of testing equipment per day and 23,000 personnel in total assisting in daily COVID testing⁵⁶. In addition, coordination and mobilization are also performed in providing other resources and services, such as electricity and food besides medical-related support, to maintain the regular operation of quarantine centers, COVID testing, and citizens' daily lives. In response to this demand, the State-owned Assets Supervision and Administration Commission (SASAC), responsible for managing all state-owned enterprises, has coordinated

⁵⁴ 上海世博展览馆成临时集中隔离收治点 援鄂医护再上阵。”新华报业网. Accessed July 31, 2022.

⁵⁵ 卢伯华 “愈封愈严重 陆各省市组建大批医疗队驰援上海抗疫 - 两岸.” 中时新闻网. 两岸 - 中时新闻网, April 3, 2022. https://www.chinatimes.com/cn/realtimenews/20220403003080-260409?ctrack=pc_chinese_headl_p01&chdtv.

⁵⁶ “4 万余名医务人员援沪 2 月 26 日以来上海本土病例出院 986 例_接种_感染者_防控.”_接种_感染者_防控, April 12, 2022. https://www.sohu.com/a/537340088_114988.

over ten large-scale enterprises to transport various materials and services to Shanghai⁵⁷. In all, the relationship framework between Shanghai, the central government, and the other provinces during the outbreak under the centralized institutional arrangement could be generalized in Fig 4:



When the outbreak happened, the central government made the decision to implement the zero-COVID policy and conveyed the order to all cities and provinces, especially in Shanghai. As the critical area of this outbreak, after receiving the order, the Shanghai government immediately planned to prepare the actual execution and evaluated the resources needed to realize the implementation. Once the Shanghai government completed the evaluation, it reported to the central government. Then the central government ordered those resources to all other cities and provinces in China, in accordance with the propaganda of the Chinese

⁵⁷ “国资委组织 10 家中央企业医疗队驰援上海。” Accessed July 31, 2022. https://content-static.cctvnews.cctv.com/snow-book/index.html?item_id.

government says, "When one place is in trouble, help comes from all sides." The other provinces that had not experienced the outbreak and will not need to enact the strict virus elimination campaign are prepared to support the critical region, in this case, Shanghai, in advance. As a result, the hierarchical and centralized government can consolidate the provincial coordination and mobilization of resources from the whole country into one city or province. In all, the above has demonstrated and proved the first hypothesis that China's centralized and hierarchal institutional structure facilitated the zero-COVID strategy implementation in Shanghai. The facilitation is supported by swift and decisive policy enactment and solid, comprehensive collaboration nationwide.

Pervasive Community-Level Institutional Structure Facilitates Zero-COVID Policy Implementation

Directing material and resources to the community level is necessary during the lockdown. In Shanghai, the strong capacity of the community-level institutions ensured the actualization of zero-COVID policy implementation. To maintain the large scale of COVID-19 screening, each community is responsible for the PCR test and needs to take charge of monitoring residents through volunteers. Take the "Beizhan" residential district ("Beizhan Jiedao"), a neighborhood located in the Shanghai Jinan district, as an example. In response to the incoming lockdown, each residential area in Beizhan Jiedao under the subdistrict immediately set up a WeChat group of the residential committee volunteer team for epidemic prevention and released the recruitment information of pandemic control volunteers through platforms such as "Pioneer Shanghai," "Love Beizhan" and "Beizhan flagship Store" WeChat official account. In each residential area, the QR code of the WeChat group in a neighborhood was posted on the community publicity board and corridor so that residents could scan and join. With those

applications, during the lockdown period, Beizhan Jiedao recruited more than 700 volunteers in its community⁵⁸. Each volunteer was assigned the task appropriately, such as distributing the pandemic prevention brochure, screening the health QR code, and conducting nucleic acid tests for the resident, based on their occupation and personal strength, to effectively assist the zero-COVID implementation. Besides the monitoring effort, the community-level institutions also helped to provide essential supplies during the lockdown of the pandemic. On March 28, right after the Shanghai government decided on a citywide lockdown, "Maqiao jiedao" organized the community official to establish a "large-scale online order" group that assisted the residents in the community to conveniently and timely purchase necessary food and supplies⁵⁹. This "temporary online store" operated by a community-level institution maintained the residences' overall needs and benefited more than 70,000 residents during the outbreak⁵⁵.

The pervasive community-level institutions also facilitate efficient communication from down to the top governance, and they serve as the bridge linking the governmental officials with the residents. On the one hand, it is easily accessible to all residents because their offices are located in residential areas. In this way, if residents need any assistance or have suggestions regarding current situations, they could instantly talk to the corresponding Jiedao and Shequ to ask for help. With the difficulty of leaving home during the lockdown period, most community-level institutions in Shanghai, such as "Quyangu Jiedao" in the Hongkou district (one of the districts in Shanghai), "Shihua Jiedao" in the Jinshan district, "Hongqiao Jiedao" in the

⁵⁸ “北站街道全面动员社区力量开展疫情防控志愿服务工作。” Accessed July 31, 2022.

<https://www.jingan.gov.cn/rmtzx/003001/20220629/be34feb3-ce57-4c11-8a81-a9c73dd38ec1.html>.

⁵⁹ “买菜不难、送菜不烦，上海这个镇变身‘大团长’，吸引 7 万人参团。” Accessed July 31, 2022.

https://export.shobserver.com/qutt/html/467996.html?content_id=1667339257&key=91909p9sPaX6dlPA_kbA2FSEGQgoyrMjlNzm-qQCOK73wSY-

Changning district, created WeChat groups that allowed residents to address their concerns and then timely report to higher-level officials⁵⁵⁶⁰⁶¹.

On the other hand, because the community-level institutions usually constitute personnel from the same neighborhood, more detailed issues during the outbreak can be noticed and reported to the upper-level officials, guaranteeing people-oriented measures in implementing the zero-Covid strategy. For example, during a weekly meeting between the residential committee of "Quyanglu Jiedao," the elevator construction in the old building was mentioned. The committee members believed it to be urgent, especially during the pandemic, because more than 50% of the residents in the building are over 70 years old. A couple over 80 years old living on the fourth floor reported that they were "afraid of taking the stairs" and rarely went downstairs for many years. This issue would also cause the inconvenience of medical personnel to get upstairs with enough equipment during the pandemic. In addition, elders who were infected may need disabled accessible facilitation to go downstairs and get treatment⁵⁶. After this meeting, the problem was reported and responded from the upper-level officials shortly. This gathering only represented one of many, and the regular meeting of community-level officials promoted the efficiency of issues noted during the pandemic.

The above has demonstrated that high convergence between the government and the local community is necessary to implement policies during a crisis. The high execution force constituted by community volunteers and the frequent communication with local residents enabled the ability to lead, respond, mobilize, and effectively execute the zero-COVID policy.

⁶⁰ 单颖文. “虹口曲阳路街道疫情防控志愿者成社区治理核心力量.” 首页. Accessed July 31, 2022. <http://www.shhk.gov.cn/xwzx/002005/20220719/5b813231-a48e-4e40-ad32-1e28b4d60ef2.html>.

⁶¹ 石化街道：以‘三抓三强’工作模式 赋能社区疫情防控_部门街镇动态_上海金山.” Accessed July 31, 2022. <https://www.jinshan.gov.cn/ywdt-jzdt/20220623/831881.html>.

Hence, the second hypothesis can be proved that a pervasive community-level instructional system is compatible with the strict lockdown in eliminating the virus.

Nature of Omicron Variant Challenges Zero-COVID Implementation

Although the virus elimination strategy seems plausible under China's hierarchical, centralized institutional structure and well-organized community-level systems (Figures 1&2), controversies still exist in justifying the necessity of enforcing the zero-COVID policy during the Shanghai pandemic outbreak. The following section will analyze the potential challenges that China faced in fighting against the current virus, which is the Omicron variant of SARS-CoV-2, contributing to over 90% of positive cases in the 2022 Shanghai epidemic⁶², and how it poses burdens on the implementation of the zero-COVID policy in China.

The Omicron variant was first detected in Botswana in November 2021 with an infamous impression of very high contagiousness⁶³. The spreading speed of the Omicron is among the fastest in all variants observed so far and soon became the dominant variant in most countries in March 2022,⁶⁴ which is only four months after being detected. As recorded in the UK, the most severe outbreak affected by the Omicron variant doubled the number of positive cases every two to three days⁶⁵.

Besides the rapid spreading speed, the concealing property of the Omicron variant is another prominent issue. As researchers reported, in the initial infection period, most patients

⁶² 陈婧. “上海疫情持续扩散 一周逾 260 人染疫 ‘精准防控’ 实效受关注.” 早报. Accessed July 31, 2022.

<https://www.zaobao.com.sg/news/china/story20220310-1250693>.

⁶³ Vitiello, Antonio, Francesco Ferrara, Amogh M. Auti, Marina Di Domenico, and Mariarosaria Boccellino. “Advances in the Omicron Variant Development.” *Journal of Internal Medicine* 292, no. 1 (2022): 81–90.

<https://doi.org/10.1111/joim.13478>.

⁶⁴ Goodman, Brenda. “What We Know about BA.2 -- Now the Dominant Cause of Covid-19 in the US.” CNN. Cable News Network, March 29, 2022. <https://www.cnn.com/2022/03/29/health/ba-2-dominant-us/index.html>.

⁶⁵ “Omicron Covid Cases 'Doubling Every Two to Three Days' in UK, Says Scientist.” *The Guardian*. Guardian News and Media, December 8, 2021. <https://www.theguardian.com/world/2021/dec/08/omicron-covid-cases-doubling-every-two-to-three-days-in-uk-says-scientist>.

show relatively mild to no symptoms. The duration between the infected and developed into severe disease may last days to multiple weeks⁶⁶. This concealing property coincided with the trend shown in Figures 1 and 2, where the number of positive cases without symptoms was almost ten times larger than the confirmed cases in the early phase of the Shanghai epidemic.

The third property of the Omicron variant is that it can maintain prolonged activity on an inanimate object. Recent studies have observed that the Omicron variant could last 194 hours on plastic surfaces and 21 hours on human skins on average, compared to 56 and 7 hours for other previous variants⁶⁷. This long activity time on the inanimate surface indicates that other than human-to-human spreading, object-to-human spreading also contributes to a significant portion of infections, which also needs to be taken into consideration in implementing the zero-COVID policy.

The above-introduced properties of the Omicron variant may pose great challenges in pursuing the virus elimination goal in China. First, the rapid spreading speed of the Omicron variant makes each containment measures consume more resources. Because all infected people and their close contact persons should all be quarantined in the government-designated hospital (Fangcang hospital), the number of medical resources required would be exponentially increased. Evidence showed that compared to the 2020 Wuhan outbreak due to the original SARS-CoV-2, where the Wuhan government established 16 Fangcang hospitals and 20,000 beds in total⁶⁸, in the 2022 Shanghai outbreak, over 100 Fangcang hospitals and over 160,000 beds

⁶⁶ “Omicron Is Sneaky. It Could Be Fatal for Us – or for Our Faith in Government | Francois Balloux.” The Guardian. Guardian News and Media, December 12, 2021. <https://www.theguardian.com/commentisfree/2021/dec/12/omicron-is-sneaky-it-could-be-fatal-for-us-or-for-our-faith-in-government>.

⁶⁷ Person, and Nancy Lapid. “Omicron Survives Longer on Plastic, Skin than Prior Variants; Nose Swabbing Found Best for Rapid Tests.” Reuters. Thomson Reuters, January 24, 2022. <https://www.reuters.com/business/healthcare-pharmaceuticals/omicron-survives-longer-plastic-skin-than-prior-variants-nose-swabbing-found-2022-01-24/>.

⁶⁸ “Coronavirus: Wuhan to Ease Lockdown as World Battles Pandemic.” BBC News. BBC, March 24, 2020. <https://www.bbc.com/news/world-asia-china-52016139>.

were established⁶⁹. Despite the population difference between these two cities (12 million in Wuhan vs. 25 million in Shanghai), the number of Fangcang hospitals in Shanghai still significantly outnumbered those in the original Wuhan epidemic. Even with the centralized institutional system, the Chinese government may have the power to organize and mobilize this considerable amount of resources; medical and food supplies were occasionally in shortage during the Shanghai lockdown since the infected people were raised enormously and rapidly, causing the loss of trust and dissatisfaction toward the zero-COVID policy to some extent. For example, multiple quarantine centers in Shanghai were reported to be dirty and lack necessary supplies⁷⁰. Many citizens complained about the difficulty of getting medical services for non-COVID diseases because medical resources were allocated to service the quarantine centers and Fangcang hospitals⁷¹.

Second, the concealing property of the Omicron variant could pose an even greater load, impeding the implementation of the zero-COVID policy. This property mainly creates two challenges: the difficulty of detecting positive cases and the long timespan of the lockdown period. A large number of infected people without symptoms created a significant burden on the contact tracing process, even with the help of the health QR code and pervasive community-level institutions. Without apparent symptoms, infected people find it hard to distinguish the exact date of infection, and hence contact tracing could not accurately locate all the closely contacting persons. Thus, it will be hard to document the trace exhaustively, creating potential threats to further secondary community spreading or overreacting and doing extreme actions to many

⁶⁹ “近 5 日累计检出阳性感染者 9.44 万余人,疫情呈现区域聚集性特点. 环球网. Accessed July 31, 2022. <https://china.huanqiu.com/article/47XAaEco9LM>.

⁷⁰ 名称. “上海隔离点环境恶劣无隐私; 货车司机吃喝如厕驾驶室遇尴尬.” Radio Free Asia, April 22, 2022. <https://www.rfa.org/mandarin/yataibaodao/huanjing/ql-04222022055903.html>.

⁷¹ “新冠疫情：封控中的上海市民生活-核酸，方舱，抢菜和愤怒.” BBC News 中文. BBC. Accessed July 31, 2022. <https://www.bbc.com/zhongwen/simp/chinese-news-61034679>.

unaffected citizens. Both aftermaths might cause serious epidemiological and social problems. For instance, overly strict governmental actions targeting some communities in Shanghai were reported, and all citizens in those communities were forced to relocate to nearby provinces⁷². Other overreacting activities, such as forced admission to Fangcang hospital and pet killing, also happened⁷³. These problems would negatively impact public support in pursuing zero-COVID pandemic control and even cause a public trust issue. Moreover, the difficulty of detecting Omicron-infected cases yielded an elongated timespan of lockdown in virus containment. Under this situation, the lockdown measure may not be as effective as before. In the 2020 Wuhan outbreak, a 76-day citywide lockdown from January 23 to April 8 has suppressed virus transmission, attained a manageable increase of infection cases, and averted a more widespread epidemic in China⁷⁴. However, affected by the Omicron variant, even with the monthly-lasting lockdown, the small-scale outbreak still continuously appeared in Shanghai. In this way, the perceived endless disease control may fatigue the public and challenge the public's tolerance of the zero-COVID policy.

Lastly, a longer activity on the inanimate object for the Omicron variant further causes difficulty in screening and contact tracing during implementing zero-COVID. Since the Omicron could be active on the plastic surfaces for a much longer time compared to the original SARS-CoV-2, everything touched by the infected people, including tables, elevator buttons, walls, etc., could be potential sources of the virus spreading. The existence of viruses on inanimate objects is

⁷² “上海疫情：防疫手段再加码，当局要求居民区整体搬迁到附近省份。” BBC News 中文. BBC. Accessed July 31, 2022. <https://www.bbc.com/zhongwen/simp/chinese-news-61173288>.

⁷³ “Shanghai Neighborhoods Resubmit to Lockdown as Covid Cases Rebound.” Caixin Global. Accessed July 31, 2022. <https://www.caixinglobal.com/2022-07-27/shanghai-neighborhoods-resubmit-to-lockdown-as-covid-cases-rebound-101918622.html>.

⁷⁴ Wuhan lockdown 'unprecedented', shows commitment to contain virus: WHO representative in China". Reuters. January 23 2020. Retrieved January 23 2020.

almost impossible to trace and detect, which results in a large number of positive cases "coming from nowhere" as well as the highly dispersive multi-chain pattern of the Shanghai outbreak⁷⁵.

In a broader scope, challenges targeting sustainable social development may expand nationwide instead of locally in Shanghai, as described following. First of all, with the existence of the non-symptom characteristic of Omicron, the cross-provincial mobility decreased in order to maximize the effort in the containment of the virus transmission leading to the potential inconvenience. For example, before the pandemic, many migrant workers in Beijing chose to reside nearby in Hebei province, where only about 50 miles away from downtown Beijing. However, because of the restriction between Beijing and Heibe province in response to the zero-COVID policy, their commutes were negatively influenced, and they even lost their jobs⁷⁶. Second, the prolonged active time of the Omicron variant on the inanimate object could also make future outbreaks inevitable. Under the current globalization trend, it is impossible to restrict all foreign items from entering China via international trade, so the virus attached to them is highly possible to sneak in. Multiple outbreaks in China induced by foreign cargo, especially cold-chain logistics, were already reported⁷⁷. Therefore, even though the Chinese government managed to control the domestic pandemic inside China, as long as the global epidemic is active, there is still a high risk of further outbreaks. Last but not least, it is apparent that the implementation of the zero-COVID policy has a high cost on the economy, so the prolonged time of pandemic control may result in an economic depression. This effect has already appeared in China, as the increase of GDP in the second quarter of 2022 only reached 0.4%, the lowest

⁷⁵ 上海市卫生健康委员会. “上海近期本土疫情最新通报.” Accessed July 31, 2022. <https://wsjkw.sh.gov.cn/xwfb/20220315/f02696b1e4f84bd9aabc2b10522dc832.html>.

⁷⁶ Weibo SuperTopic #Dynamic Zero-COVID#

⁷⁷ Fan, Yu, Lingyu Shen, Yi Tian, Quanyi Wang, and Zhiyong Gao. “进口冷链水产品新型冠状病毒污染传播探讨.” *中华流行病学杂志*, 42(6) : 992-1001., 2021. <https://doi.org/10.3760/cma.j.cn112338-20201218-01420>.

since the COVID-19 pandemic started, and the unemployment rate has reached a record high in history⁷⁸. Applying a flexible approach to the resumption of work in coordinating epidemic prevention and sustaining economic as well as social development is key to confronting the financial challenge of China in response to the COVID-19 crisis.

Further Implication and Conclusion

Even though the COVID-19 pandemic has lasted for years, the discussions of management strategies in response to this public health crisis were still continued. Prior research have focused on the justification of the zero-COVID strategy and its political implication in China. Yet, limited attention has been given to examining the function of Chinese institutional features in implementing this policy. This article recapitulates the framework of China's institutional system and analyzes its compatibility in pursuing the zero-COVID strategy by using the 2022 Shanghai lockdown as the case study, answering the question of what might be advantages of China in pursuing the virus elimination during the pandemic. The research concludes that China's centralized and hierarchical institutional structure enhances the effectiveness and swiftness of policy enactment and consolidated mobilization during the Shanghai lockdown. Moreover, China's highly pervasive community-level institutional system facilitates effective communication between the government and the public, as well as helps practice the regulation in achieving the zero-COVID goal under the Shanghai case. The above findings can infer the potential reasons why the Chinese government chose to implement the virus elimination strategy at the beginning of this crisis instead of the virus mitigation approach.

⁷⁸ Wakabayashi, Daisuke. “中国二季度 GDP 增长 0.4%，创疫情以来最低增速。” The New York Times. The New York Times, July 15, 2022. <https://cn.nytimes.com/business/20220715/china-economy-slows/>.

The research also demonstrated potential difficulties and complications that the zero-COVID principles might face in China. Through analyzing the characteristics of the current prevalent virus, the Omicron variant, results showed that its rapid spreading speed, concealing property, and longer activity on inanimate objects would challenge the patience and resolution of the public in reacting to the zero-COVID policy. These findings are able to carry a more dynamic perspective to future crisis management policy implementation. While answering the primary research questions, this article also summarized four containment measures of the zero-COVID strategy in China, generating a systematic definition for further research use.

This commentary article focuses on the pandemic of the Shanghai outbreak, so the findings contain limitations that it might not apply to other cities or countries, causing a lack of external validity. Even though the broad structure will be the same, there are still minor varieties between provinces in enacting the dynamic zero-COVID policy depending on different factors such as area, population, or culture of the city. Further research can examine those disparities by selecting additional locations during the same period, such as comparing Shenzhen (from March 14 to March 21, 2022)^{79 80} and Shanghai lockdowns in response to the Omicron variant. Second, limited documented news or resources are available online as the primary data because of the media censorship in China. In the analyzing challenges section, some posts containing the public opinions shared on WeChat or Weibo, the two major social media platforms in China, during the Shanghai lockdown, had been deleted when this paper was drafted. Thus, the original crawling methodology has to be changed. Finally, this article only purely analyzes the compatibility between China's institutional system and its implementation without arguing the morality and

⁷⁹ "Shenzhen shutdown in China COVID surge". 7NEWS. 14 March 2022. Archived from the original on 14 March 2022.

⁸⁰ "Shenzhen lifts citywide lockdown as Covid-19 situation seen controllable". 21 March 2022. Archived from the original on 21 March 2022.

value appropriateness regarding the lockdown or zero-COVID policy. Further research can study the attitudes of the mass, industries, and public administrators toward pandemic policy, leading to a deeper and more comprehensive understanding of China's crisis management. Besides the limitation, this study provides a fundamental structure in proving the efficacy of China's institutional systems with cohesive central leadership and pervasive local management in reacting to emergency control, as in the COVID-19 pandemic.