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Chinese provincial government responses to COVID-19

BSG-WP-2021/041

Version 2.0

January 2022

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This working paper is updated frequently. Check for the most recent version here: www.bsg.ox.ac.uk/covidtracker

The most up-to-date version of our technical documentation can be found on the project's GitHub repo: www.github.com/OxCGRT/covid-policy-tracker

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Abstract

China suffered three large-scale multi-province outbreaks driven by the Delta variant in the second half of 2021. Although they spread to more than ten provinces, all outbreaks were effectively controlled under what Chinese public health authorities describe as the “dynamic clearance” strategy. More recently, the spread of the Omicron variant has brought new challenges. Drawing on the Oxford COVID-19 Government Response Tracker (OxCGRT)'s Chinese subnational data, this paper investigates patterns in government responses to the Delta waves and the threat of Omicron variant and trends in vaccination and international travel policy in China. We find that Chinese provinces have implemented fewer high-cost policies and improved the precision of measures during the Delta waves, though the emergence of the new Omicron variant saw an increase in restrictions on movement between areas. The trend toward more targeted measures is clearer in the provinces with experience of several rounds of Delta outbreaks and continues even local transmissions of the Omicron variant have appeared in China at the beginning of 2022. Meanwhile, with vaccination coverage increasing steadily, some entry restrictions have been relaxed in China, though they remain relatively strict compared to other countries.

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Summary

- Five major waves of COVID-19 outbreaks have hit China since the beginning of 2021, tied to imported sources. The second, third, and fourth surges were caused by the Delta variant, two of which spread to more than ten provinces, and both the Delta and Omicron variants spread across provinces during the latest wave.
- In coping with the Delta variant, China has maintained the policy target of “dynamic clearance”, aiming to halt all community transmission of COVID-19, while the response patterns have gradually transitioned along five stages through 2021 and into 2022: 1) widespread preventative measures in January 2021 in anticipation of greater mixing during the Chinese New Year season, 2) A relatively low baseline level of prevention and control measures from March to June, 3) A reactive response in July to the Delta variant, 4) relatively high baseline prevention and control measures from August to October, and 5) more targeted measures in November and December. Overall, the peak stringency of China's control measures in 2021—when the highest number of restrictive measures affected the largest population—came with the first Delta wave in summer 2021, though specific geographic regions saw more stringent measures in later waves. Facing the transmission risk of the Omicron variant at the beginning of 2022, China continues to implement dynamic clearance through largely targeted responses.
- Looking at individual policies, the number of provinces mandating stay-at-home measures in response to the most recent Omicron wave is similar to previous waves in 2021, though a number of local governments have also adopted more targeted restrictions at the micro-scale. We also see a larger number of restrictions on movement between areas and requirements around face masks.
- Apart from Non-Pharmaceutical Interventions (NPIs), China has fully vaccinated more than 85% of people, and more than 0.33 bn (23%) people have received booster shots by 6 January 2022. The government is now working to promote booster shots further.
- While the vaccination coverage increases steadily, China has gradually relaxed some entry restrictions, but it retains restrictive controls on international travel compared to most other countries.

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1. Introduction

Since the first domestic case with the Delta variant was confirmed in late May 2021 in Guangdong province,¹ China has experienced three large-scale multi-province outbreaks driven by the Delta variant in the second half of 2021. Each outbreak spread to more than ten provinces but was effectively controlled with fewer than 5,000 domestic cases, and no death was recorded nationwide during each outbreak (see Section 4.1 for detailed information). In coping with the Delta variant and even the threat of Omicron at the beginning of 2022, China maintained a policy of strictly controlling transmission, sometimes termed a “zero COVID” approach, but described by Chinese public health officials as the “dynamic clearance” of confirmed cases following each local transmission episode.² According to the Chinese National Health Commission, “the current policy target is dynamic clearance instead of zero infection, aiming to maximise early detection, early treatment, and early disposal and resolutely prevent the continuous spread of the epidemic in communities.”³ This policy stresses preparedness for potential outbreaks and a commitment to halt all social transmission, though new cases are anticipated. In this context, this paper examines how China was able to maintain its “dynamic clearance” policy—we use this term to describe China’s approach in this paper—during the Delta waves and how policies evolved over the course of 2021. Moreover, as most countries gradually abolished “elimination” policies and relaxed international travel restrictions based on increasing vaccination coverage in the fourth quarter of 2021, the paper also considers China’s progress in vaccination and variation in its border control measures.

This paper draws on the Oxford COVID-19 Government Response Tracker (OxCGRT) at the Chinese subnational level. The OxCGRT China Subnational Team, consisting of around 80 Mandarin-English bilingual volunteers, started collecting data on COVID-19 government responses in late January 2021. Data are collected from publicly available sources such as news articles and government press releases and briefings. This dataset records government responses to COVID-19 in 31 provincial-level jurisdictions, all of which receive policy guidelines or recommendations from national authorities, such as the National Health Commission and the Ministry of Finance.⁴ It records the day-by-day policy changes in these subnational jurisdictions since 1 January 2020. The dataset can be accessed on our GitHub repository.⁵

All the data and correlated qualitative notes are written in English to facilitate wide accessibility. While the OxCGRT China Subnational Dataset aims to help researchers and policymakers around the world to understand the policy

¹ Caixin. Among three breakthroughs made by Delta, what is the difference this time? 2021. <https://opinion.caixin.com/2021-08-05/101751413.html>

² National Health Commission. The NHC’s latest answer to the Omicron, 2022. <http://www.nhc.gov.cn/xcs/yqfkdt/202201/1c1a23e9e172481da9a6b087c3eaa8fe.shtml>

³ Xinhua News Agency. “Achieving the greatest prevention and control effect with the smallest social cost”- Interview with Liang Wannian, head of the expert group of the National Health Commission of the PRC. 2021. <https://baijiahao.baidu.com/s?id=1716283073410454629&wfr=spider&for=pc>

⁴ Ministry of Finance. Notice of the Ministry of Finance, the National Health Commission and the State Administration of Traditional Chinese Medicine on the release of the 2020 public health system construction and major epidemic prevention and control system construction subsidy budget” (No. 99),2020. http://sbs.mof.gov.cn/zxzyzf/ggwsfwbzj/202007/t20200731_3559671.htm

⁵ <https://github.com/OxCGRT/covid-policy-tracker>

developments in China, this working paper seeks to report some findings on (1) Chinese government response patterns in tackling the Delta and Omicron variants since 2021; (2) variation of provincial response to the most widespread Delta waves; (3) trends in vaccination and international travel policy in China.

2. Data and Measurement

For Chinese provincial-level jurisdictions, OxCGRT reports publicly available information on 20 indicators (see Table 1). These indicators are used consistently across countries, regions, territories, and subnational units where we collect data.⁶ Because the data record these standardised aspects of government response, they may not capture all aspects of a particular government's policies.

There are three types of indicators:

- Ordinal: These indicators measure policies on a simple scale of severity or intensity. These indicators are reported for each day a policy is in place. Many have a further flag to note if they apply only to a sub-region of a jurisdiction or a specific sector or apply throughout that jurisdiction or across the economy.
- Numeric: These indicators measure a specific monetary value in USD, using historical exchange rates. These indicators are only reported on the day they are announced.
- Text: This is a "free response" indicator that records other information of interest and the information sources.

As we have done consistently across all the OxCGRT coding units, data are collected from publicly available sources such as news articles and government press releases and briefings. These are identified via internet searches by a team of around 80 volunteers from Oxford University and partner institutions. OxCGRT records the original source material so that coding can be checked and substantiated. Sources are available in the "notes" version of the data files on Github. Where there are multiple policies in place – for instance, in a province that has one policy in a county with an outbreak and a different policy for the rest of the region – we will always record the most stringent policy.

OxCGRT measures for China provinces contain:

1. Policies made by ministries and equivalent authorities in the central government that apply to the country as a whole or for the provinces concerned. (These data are referred to with a jurisdiction label of NAT_GOV in our detailed technical documentation)
2. Policies made by provincial governments. We choose provinces as coding units to keep consistency with other subnational datasets, where policies in equivalent jurisdictions are recorded. When a policy is approved by a provincial government, if it applies to the whole provincial jurisdiction, then it will be marked as a "general" provincial policy; if it applies only to one or some municipal administrations, then it will be marked as a "targeted" provincial policy, for the 10 indicators that have a flag for geographical coverage. These data are referred to with a jurisdiction label of STATE_WIDE in our detailed technical documentation.

⁶ Thomas Hale, Noam Angrist, Rafael Goldszmidt, Beatriz Kira, Anna Petherick, Toby Phillips, Samuel Webster, Emily Cameron-Blake, Laura Hallas, Saptarshi Majumdar, and Helen Tatlow. (2021). "A global panel database of pandemic policies (Oxford COVID-19 Government Response Tracker)." *Nature Human Behaviour*. <https://doi.org/10.1038/s41562-021-01079-8>

3. Policies approved by a lower level of government, such as a municipality or a county, will be recorded as a provincial policy and marked as a geographically “targeted” policy for the ten indicators that have a flag for geographical coverage. Policies applying to partial areas of a county-level administration are not recorded. These policies are recorded as STATE_WIDE data when they are more stringent than the policies enacted by province-level governments.

In our main published dataset, we combine these decisions at different levels to record a single policy for each jurisdiction for each indicator. This is referred to as STATE_TOTAL in our detailed technical documentation, and is consistent with how the OxCGRT records and tracks subnational data across several countries, including the United States, Brazil, Canada, and the United Kingdom. For the ten indicators having a flag for geographical coverage, we always record the most stringent policy existing in a province, regardless of which level of government it came from. For the ten indicators without the flag, we always record the most stringent policy applied to the whole province. Our paper published in *Nature Human Behaviour* (Hale et al. 2021) contains further details about how we collect, denote, transform and aggregate data between subnational jurisdictions.

In order to ensure accuracy and consistency in the interpretation of the sources, all data collectors are required to complete a thorough training process. We also hold weekly meetings to discuss and clarify how to code edge cases, building a shared understanding of the codebook and its interpretation in light of concrete examples. Every data point is reviewed or will be reviewed by a second coder, who examines the data entry and the original source, and either confirms the coding choices of the original coder or flags the data entry for escalation. Data may be corrected via this review process or following external feedback. Substantial revisions are rare.

The Chinese subnational data are presented in the main OxCGRT dataset on GitHub. Data collection occurs in once-a-week cycles, and the database will continue to be updated and reviewed to provide accurate real-time information on the China subnational government response. The data are published in real-time and made available immediately on GitHub and licensed under the Creative Commons Attribution CC BY 4.0 standard.

Table 1: OxCGRT indicators

ID	Name	Type	Binary flag
Containment and closure			
C1	School closing	Ordinal	Geographic
C2	Workplace closing	Ordinal	Geographic
C3	Cancel public events	Ordinal	Geographic
C4	Restrictions on gathering size	Ordinal	Geographic
C5	Close public transport	Ordinal	Geographic
C6	Stay at home requirements	Ordinal	Geographic
C7	Restrictions on internal movement	Ordinal	Geographic
C8	Restrictions on international travel	Ordinal	No
Economic response			
E1	Income support	Ordinal	Sectoral
E2	Debt/contract relief for households	Ordinal	No
E3	Fiscal measures	Numeric	No
E4	Giving international support	Numeric	No
Health systems			
H1	Public information campaign	Ordinal	Geographic
H2	Testing policy	Ordinal	No
H3	Contact tracing	Ordinal	No
H4	Emergency investment in healthcare	Numeric	No
H5	Investment in Covid-19 vaccines	Numeric	No
H6	Facial coverings	Numeric	Geographic
H7	Vaccination policy	Numeric	Payment source
H8	Protection of elderly people	Numeric	Geographic
Miscellaneous			
M1	Other responses	Text	No

3. Indices of COVID-19 Policy Response

In addition to providing the raw data, the OxCGRT China Subnational Dataset also provides composite measures that, as described below, combine different indicators into a general index. This approach brings both strengths and limitations. Helpfully, cross-jurisdiction measures allow for systematic comparisons across different jurisdictions. By measuring a range of indicators, they mitigate the possibility that any indicator may be over- or mis-interpreted. However, composite measures can also leave out some important information and make strong assumptions about what kinds of information counts. If the information left out is systematically correlated with the outcomes of interest or systematically under- or overvalued compared to other indicators, such composite indices may introduce measurement bias.

Broadly, there are three common ways to create a composite index: a simple additive or multiplicative index that aggregates the indicators, potentially weighting some; Principal Component Analysis (PCA), which weights individual indicators by how much additional variation they explain compared to the others; Principal Factor Analysis (PFA), which seeks to measure an underlying unobservable factor by how much it influences the observable indicators. Each approach has advantages and disadvantages for different research questions. In this paper, we rely on simple, additive unweighted indices as the baseline measure because this approach is most transparent and easiest to interpret and replicate. PCA, PFA, or other approaches can be used as robustness checks.

For Chinese provincial-level jurisdictions, the indicators described above are aggregated into four policy indices, each of which includes a different set of government responses (the indicators that make up each index are listed in Table 2):

1. A **Containment and Health Index**, showing how many and how forceful the measures to contain the virus and protect citizen's health are (this combines 'lockdown' restrictions and closures with health measures such as testing policy and contact tracing);
2. An **Economic Support Index**, showing how much economic support has been made available (such as income support and debt relief) to individuals and households;
3. A **Stringency Index**, which records the strictness of 'lockdown style' closure and containment policies that primarily restrict people's behaviour;
4. An overall **Government Response Index** which records how the response of provinces has varied over all indicators, capturing the full range of government responses.

Each index is composed of a series of individual policy response indicators. For each indicator, we create a score by deducting half a point from the ordinal value for policies that are geographically targeted to a subset of the jurisdiction where such a geographic flag exists. We then rescale each of these by their maximum value to create a score between 0 and 100, with a missing value contributing 0. These scores are then averaged to get the composite indices.

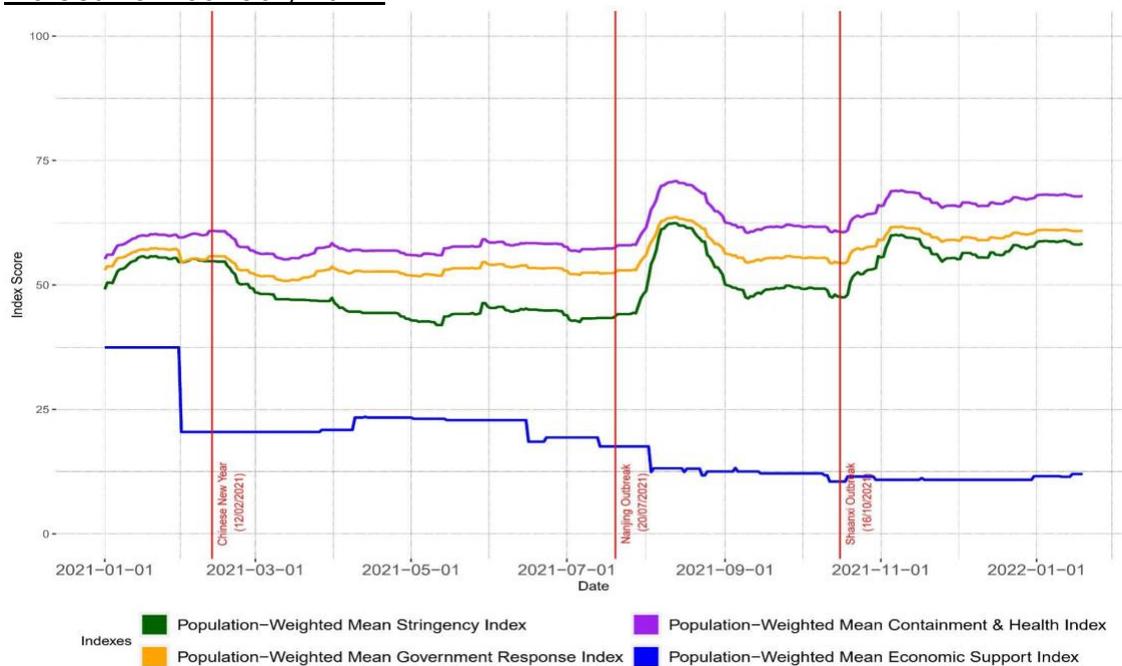
Importantly, the indices should not be interpreted as a measure of the appropriateness or effectiveness of a government's response. They do not provide information on how well policies are enforced, nor does it capture demographic or

cultural characteristics that may affect the spread of COVID-19. Furthermore, they are not comprehensive measures of policy. They only reflect the indicators measured by the OxCGRT (see Tables 1 and 2) and thus may miss important aspects of government response. The value and purpose of the indices are instead to allow for efficient and simple cross-province comparisons of government interventions. Any analysis of a specific province should be done on the basis of the underlying policy, not on an index alone. In the sections that follow, we display principally the Stringency Index.

Table 2: OxCGRT indices

<u>Index name</u>	<u>C1</u>	<u>C2</u>	<u>C3</u>	<u>C4</u>	<u>C5</u>	<u>C6</u>	<u>C7</u>	<u>C8</u>	<u>E1</u>	<u>E2</u>	<u>H1</u>	<u>H2</u>	<u>H3</u>	<u>H6</u>	<u>H7</u>	<u>H8</u>
<u>Government Response Index</u>	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
<u>Containment and health Index</u>	✗	✗	✗	✗	✗	✗	✗	✗			✗	✗	✗	✗	✗	✗
<u>Stringency Index</u>	✗	✗	✗	✗	✗	✗	✗	✗			✗					
<u>Economic Support Index</u>									✗	✗						

Figure 1: Population weighted mean across Chinese provinces of the four OxCGRT indices from January 2021⁷



⁷ The Nanjing outbreak and Shaanxi outbreak are denoted by the first confirmed case of the Nanjing epidemic transmission chain and Shaanxi-Gansu-Inner Mongolia tour group transmission chain, respectively.

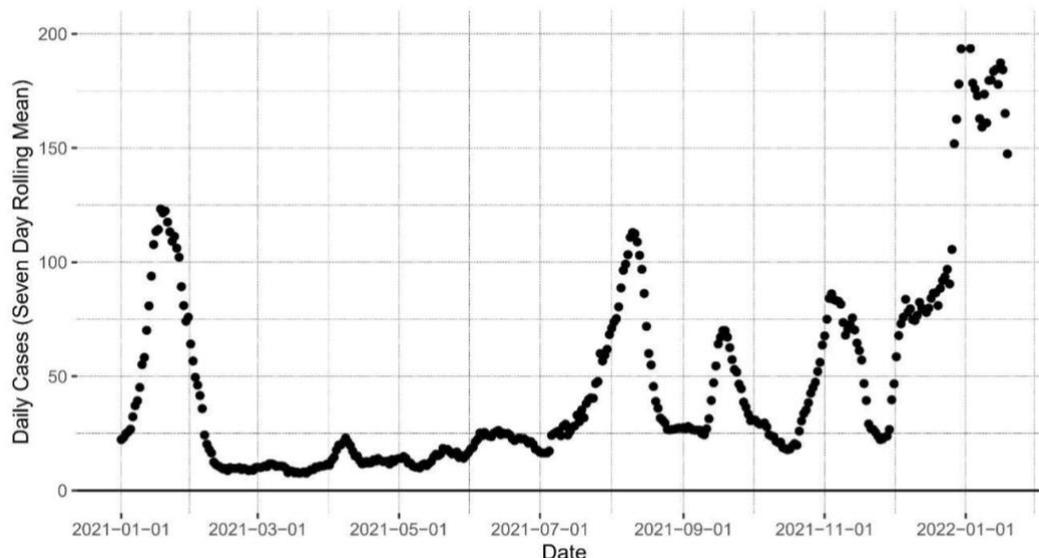
4. Transition of response patterns in coping with Delta and Omicron

This section offers a brief overview of COVID-19 outbreaks in China in 2021 and shows the longitudinal change of China's government responses to COVID-19 in 2021 from the facets of overall patterns and individual policies.

4.1 Five major waves of COVID-19 outbreaks in China since 2021

Figure 2 and Table 3 show five major waves⁸ of COVID-19 outbreaks since the beginning of 2021, which were all tied to imported sources.⁹ The second, third, and fourth case surges were caused by the Delta variant, two of which spread to more than ten provinces, and both the Delta and Omicron variants spread across provinces during the latest wave. Moreover, independent transmission chains of the epidemic have been increasing in the second half of 2021. Wu Liangyou, Deputy Director of the National Health Commission's (NHC) Disease Control Bureau, said China faced a hefty challenge in the winter of 2021 and spring 2022 in controlling the virus because of the elevated pandemic level across the world, especially in neighbouring countries.¹⁰

Figure 2: Daily new confirmed COVID-19 cases since 2021 (updated to 19 January 2022).



In detail, these five epidemic waves proceeded as follows:

⁸ We define a wave as daily new cases of the Chinese mainland have surpassed 20 for more than a week, which subsides when the daily new cases drop below 20.

⁹ People's Daily. The sources of Omicron in three places might be international express, 2022. <https://wap.peopleapp.com/article/6472268/6356111>

¹⁰ Chinanews.com The latest situation of the epidemic, imported virus prevention of border ports, child vaccination... The State Council's joint prevention and control mechanism responds to hot issues, 2021. <https://www.chinanews.com.cn/gn/2021/11-06/9603748.shtml>

- (1) The first wave began on 1 January 2021, and the daily new case number peaked at 144 on 14 January 2021, then dropped back to under 20 on 5 February 2021. While three provinces have recorded more than 20 new cases daily, the wave is best characterised as a regional outbreak as most cases were contributed by the two unrelated surges in Shijiazhuang of Hebei province and Suihua of Heilongjiang province, respectively.
- (2) The second wave occurred on 8 July 2021, peaked at a case number of 143 on 9 August 2021, and lasted until 30 August 2021. The leading transmission chain originated from Nanjing, the provincial capital and central airport city in Jiangsu province. The source of this cluster was traced back to infected aircraft cleaners working for the Nanjing Lukou International Airport in early July. And this transmission chain spread across twelve provinces owing to the highly infectious Delta variant and the traffic centrality of Nanjing in China's transport network.¹¹ Apart from Nanjing, this wave had two other sources for severe provincial outbreaks, Zhengzhou, the capital of Henan province, and Ruili, a city near the China-Myanmar border in Yunnan province, whose outbreaks did not spill to other provinces.
- (3) The third wave commenced on 10 September 2021 and reached the height of 143 in six days, and finally fell back to below 20 daily new cases on 8 October 2021. Two separate source cities of this virus outbreak without spread among provinces are Putian, a city of 3 million residents in East China's Fujian province, and Ruili. The source of the Putian cluster was a returnee from Singapore who arrived in China in August,¹² while Ruili's epidemic resurgence originated from imported cases from Myanmar and has continued since early July.¹³
- (4) The fourth wave started on 16 October 2021, quickly following the last wave, peaked at 109 newly confirmed cases on 2 November 2021, and ended on 19 November 2021. A tour group transmission chain, centred initially around cases found in a cross-provincial tour group travelling to Inner Mongolia, Shaanxi, and Gansu, has spread to 14 provinces,¹⁴ creating a new transmission peak for 2021. Meanwhile, there were several other clusters tied to unrelated imported cases. The epidemic transitions of the other two source cities have been contained within their provinces. Dalian, China's main cold-chain hub in Liaoning province, suffered its third cold-chain-related COVID-19 outbreak,¹⁵ while border city Heihe in Northeast China faced a coronavirus flare-up caused by an imported case as well.

¹¹ Pengpai News. A picture to understand 828 cases of Nanjing epidemic transmission chain, 2021. https://m.thepaper.cn/newsDetail_forward_13777996

¹² Gmw. The suspected source of the Putian epidemic was diagnosed in 38 days after entering the country! Experts say... 2021. <https://m.gmw.cn/baijia/2021-09/12/1302572184.html>

¹³ Gmw. "We will defend the country to death!" What happened in Ruili, a small border town under the epidemic? 2021. <https://m.gmw.cn/baijia/2021-10/31/1302659195.html>

¹⁴ Bjd.com. More than 900 people were infected in this round of the epidemic, spreading to 44 cities in 20 provinces! Updated diagram, 2021. <https://news.bjd.com.cn/2021/11/07/10002892.shtml>

¹⁵ Chinanews.com. From the people: Dalian hold on, no winter will not pass, 2021. <http://www.chinanews.com/sh/2021/11-16/9610091.shtml>

(5) The fifth wave began on 26 November 2021, which quickly succeeded the fourth wave, peaked at 209 daily new cases on 27 December 2021, and is continuing at the time of writing. This wave of epidemic had more clusters than the previous four epidemic waves and smaller spread across provinces of each cluster compared with the first, second, and fourth waves. Five source cities of this wave include Manzhouli, a border city in north China's Inner Mongolia Autonomous Region, Xi'an, the capital of Shaanxi province, Zhengzhou, Pudong District of Shanghai Municipality, and Jinnan District of Tianjin Municipality. Particularly, the Omicron variant hit Jinnan District on 8 January 2022 and caused local transmissions and inter-provincial spread in China for the first time.¹⁶ Six provinces of mainland China have reported local Omicron outbreaks by 19 January 2022.^{17, 18} Notably, the number of reported cases was significantly higher in the fifth wave relative to the previous four, but still extremely small compared to other countries.

Table 3: Five major COVID-19 outbreaks since 2021 (updated to 19 January 2022)

	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5
Start	01/01/2021	08/07/2021	10/09/2021	16/10/2021	26/11/2021
End	04/02/2021	30/08/2021	07/10/2021	19/11/2021	Continuing
Delta variant	No	Yes	Yes	Yes	Yes
Omicron	No	No	No	No	Yes
Total number of cases ¹⁹	2598	2917	1229	1948	6830
Number of domestic cases	2099	1339	560	1344	4697
Number of imported cases	499	1578	669	604	2133
Peak date	14-Jan-21	9-Aug-21	16-Sep-21	2-Nov-21	27-Dec-21
Peak case number	144	143	84	109	209
Number of severe provincial outbreaks ²⁰	3	3	2	4	7
Source cities of severe provincial outbreaks	Shijiazhuang; Suihua	Nanjing; Zhengzhou; Ruili	Putian; Ruili	Ejina; Dalian; Heihe	Manzhouli; Xi'an; Zhengzhou; Tianjin; Shanghai
Number of provinces with outbreaks connecting to source cities	7	14	2	16	14

¹⁶ Hongxin News. The epidemic of Tianjin has been linked to Anyang, Henan province, 2022. <http://news.hsw.cn/system/2022/0110/1416750.shtml>

¹⁷ Hangzhou Daily. Shanghai confirms Omicron! Omicron has appeared in six places, involving 4 chains of transmission, 2022. <https://baijiahao.baidu.com/s?id=1722011805693247837&wfr=spider&for=pc>

¹⁸ Pengpai News. The new case in Beijing was confirmed as Omicron, 2022. https://m.thepaper.cn/baijiahao_16317057

¹⁹ National Health Commission of the People's Republic of China, 2021. http://www.nhc.gov.cn/xcs/yqjzqk/list_gzbd.shtml

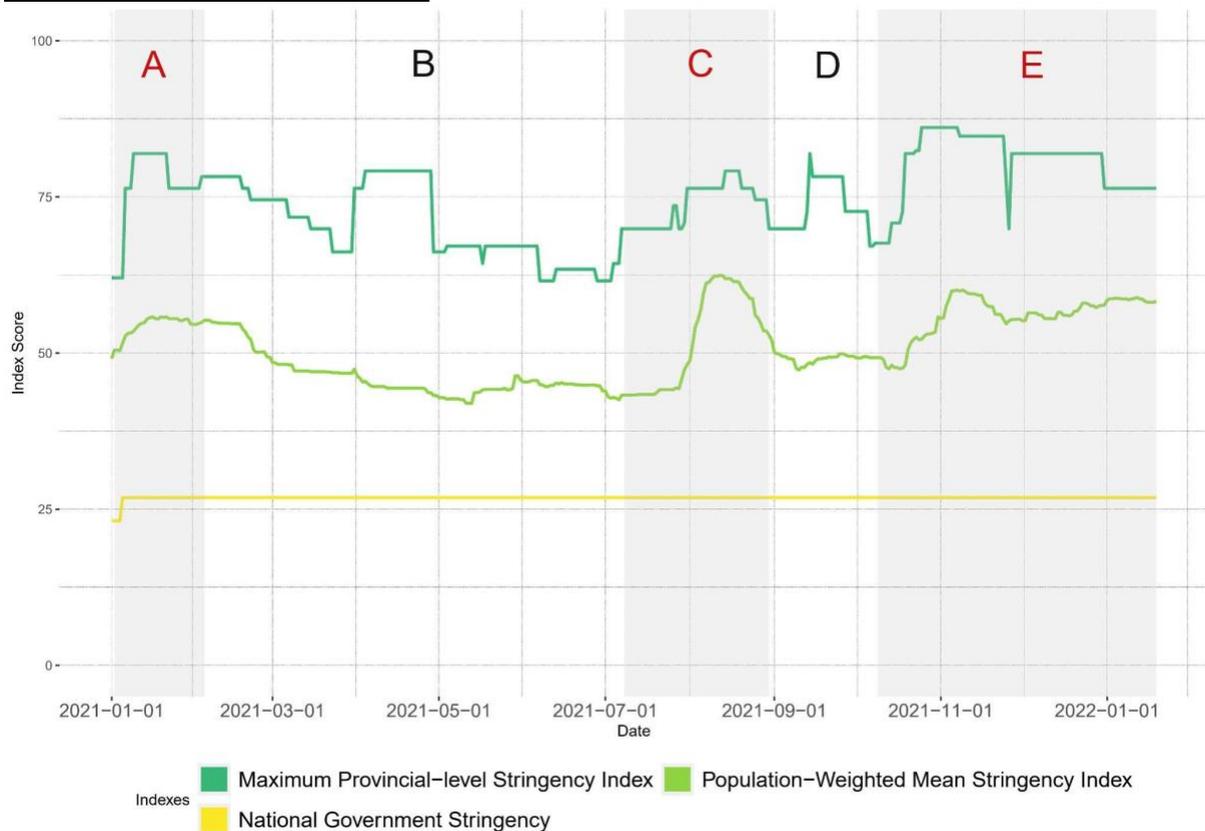
²⁰ We define the severe provincial outbreak as a provincial outbreak with more than 20 daily new confirmed cases.

4.2 Comparison of policy response patterns in different waves

In coping with the five main epidemic waves in 2021, China pursued the “dynamic clearance” strategy in each wave. Following this consistent policy target, the overall response pattern can be divided into five stages (Periods A-E in Figure 3): preventative measures in January, low baseline prevention and control from March to June, reactive response in July, high baseline prevention and control from August to October, and more targeted responses in November and December. Moreover, from the perspective of individual policies, we observe significant differences in stay-at-home policies, restrictions on internal movement, and facial covering policies across epidemic waves.

4.2.1 Comparison of overall response patterns

Figure 3: Comparison of maximum recorded stringency, average population-weighted stringency of Chinese provinces, and stringency of the national government (updated to 19 January 2022)



As Figure 3 shows, the maximum provincial stringency index (max SI) has remained 60 or above, and the mean population-weighted provincial stringency index has remained above the medium level ($SI \geq 40$) throughout 2021 and into 2022. This shows that different provinces have consistently applied more stringent restrictions throughout the year, but the national average has remained more constant. Moreover, the province-level indices remain higher than that of the national government, which means most policies were applied at a provincial jurisdiction level or below. Observing the longitudinal change, we find three prominent escalations of the provincial mean stringency index in 2021, corresponding to the first, second, and

fourth epidemic waves described in section 4.1, respectively. Meanwhile, the mean stringency index stays relatively stable from August to October, along with the third epidemic wave.

We can divide the variations in the overall response pattern in each outbreak as follows:

- (1) **Preventative responses in the first epidemic wave (Period A).** Anticipating increased transmission risk around the Spring Festival (Chinese New Year) travel season of 2021, governments put in place preventative measures in advance of the January wave, likely reducing its intensity. For example, on 30 December 2020, the State Council of the PRC issued the guidelines for epidemic prevention and control measures during the New Year's and Spring Festival of 2021, which was forwarded and implemented by nearly all provinces later.²¹ Meanwhile, China's cultural and tourism administration authorities also imposed stricter tourist restrictions to prevent resurgences of the novel coronavirus.²²
- (2) **Baseline prevention and control from March to June (Period B).** After the first epidemic wave was relieved on 5 February 2021 and the Spring Festival travel season ended on 8 March 2021, most provinces returned to baseline prevention and control with a relatively low SI around 45, though a few provinces that saw small outbreaks adopted restrictive controls. The baseline prevention and control mean when the epidemic gets eased, or no new cases appear, normal life and work could be resumed while routine prevention measures, such as wearing masks in public places and reducing gathering activities, are maintained. It emphasised daily prevention instead of stringent controls of an emerging transmission chain.²³
- (3) **Reactive responses in the second epidemic wave (Period C).** During the second epidemic wave (Period C), the stringency index showed a steeper increase and reached a higher level, which likely arose from several reasons. First, the pattern of the population movement during Period C featured large-scale inter-provincial tourism and business trips instead of migration between urban and rural areas in Period A. Secondly, the traffic centrality of Nanjing in China's transport network further led the transmission chain to spread across twelve provinces. Thirdly, this was the first time the Delta variant caused inter-provincial transmissions in China, so provinces implemented stricter policy responses since the higher infectivity of this new variant had been well perceived and recognized by China's scholars and governments before.^{24,25}

²¹ Chinese government website. Guidelines for Epidemic Prevention and Control Measures during the New Year's and Spring Festival of 2021. 2020. http://www.gov.cn/xinwen/2020-12/30/content_5575601.htm

²² Chinese government website. Tourism restrictions tightened for holidays. 2020. http://english.www.gov.cn/statecouncil/ministries/202012/30/content_WS5febd156c6d0f72576942aea.html

²³ Xinhua News Agency. The Joint Prevention and Control Mechanism of the State Council releases the Guidelines on Normalised Prevention and Control of COVID-19, 2020. http://www.gov.cn/xinwen/2020-05/08/content_5509965.htm

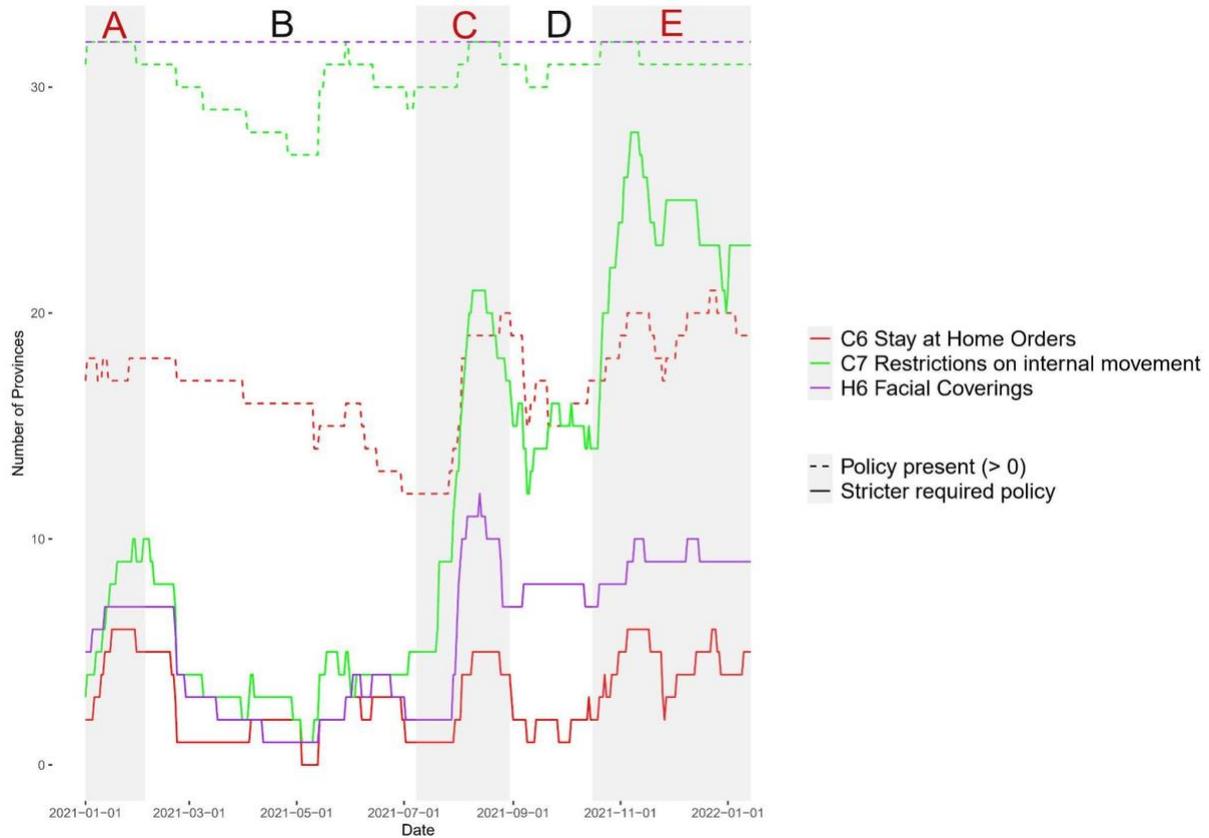
²⁴ Pengpai News. Zhong Nanshan: In response to the Delta variant, the vaccine is still effective, but the concept of "close contact" should be updated! 2021. https://m.thepaper.cn/baijiahao_13373138

²⁵ MedRxiv. Why is the Delta variant spreading so quickly? Chinese researchers found that the virus load increased 1,000 times and the incubation period shortened. 2021. https://general.medsci.cn/article/show_article.do?id=c6a121495336

- (4) **Stricter baseline prevention and control in Autumn (Period D).** After the second regional outbreak in the summer, the mean provincial stringency index stayed relatively stable from August to October (Period D). Despite the third regional outbreak, the stringency index did not rise significantly but showed a higher value than that from March to June (Period B). This is because the whole country was implementing stricter regular epidemic prevention and control measures after the second regional outbreak driven by the Delta variant. In addition, the line of Max SI shows two extra waves in Periods B & D, which were shaped by the local epidemics in Yunnan and Fujian provinces that led the local governments to adopt stringent policies.
- (5) **Targeted responses to multiple chains of epidemic transmissions in the fourth and fifth epidemic waves (Period E).** After the stable Period D, the mean provincial stringency index gradually reached another peak because, at that time, an outbreak spilled over into 16 provinces in November. And the following successive but scattered outbreaks in the fifth epidemic wave kept the mean SI at a relatively high level, around 58, in December. Under the rising pressure of coping with multiple unrelated imported epidemic sources and even the threat of Omicron at the beginning of 2022, provincial policy responses escalated through the expanded use of geographically targeted control measures.

4.2.2 Comparison of individual policies

Figure 4: Number of Chinese provinces with any stay-at-home policies, restrictions on internal movement, and facial covering policies compared to those implementing stricter versions of the policies (updated to 19 January 2022)



Looking at stay-at-home policies (C6), restrictions on internal movement (C7), and facial covering policies (H6) sheds further light on the evolution of response patterns to subsequent epidemic waves. We focus on this subset of policies for several reasons. Firstly, facial covering policy (H6) and stay-at-home policy (C6) represent low-cost and high-cost policies,²⁶ respectively, while the former is adopted as a baseline prevention and control measure and the latter is the most severe restrictive policy (at the highest level, the “lockdown” of a city) when an epidemic occurs. Secondly, restrictions on internal movement (C7) are the essential policy to deal with the continuous transregional spread of the epidemic and can demonstrate the core of the “dynamic clearance” strategy that local flare-ups linked to highly transmissible variants are anticipated, but once a new cluster is discovered, the priority is to halt its spread, especially across provinces.

Figure 4 shows the number of provinces with C6, C7, and H6 (coding value > 0, represented by the dotted lines) in place compared to the number of provinces adopting more stringent versions of those policies (C6 coding value $\geq 2T$, represented

²⁶ The cost includes both the psychological and economic costs for citizens to adhere to the policy. Petherick, A., Goldszmidt, R., Andrade, E.B. et al. A worldwide assessment of changes in adherence to COVID-19 protective behaviours and hypothesised pandemic fatigue. *Nat Hum Behav* 5, 1145–1160 (2021). <https://doi.org/10.1038/s41562-021-01181-x>

by the solid red line, C7 coding value $\geq 2T$, represented by the solid green line, and H6 coding value $\geq 3T$, represented by the solid purple line). The dotted lines therefore represent the number of provinces with at least a soft version of a given policy (either at the provincial level or at a lower level of government), while the solid lines show the number of provinces with the most stringent version of that policy. Observing the longitudinal change, we find significant variations of individual policy adoption over time:

- (1) **Fewer compulsory stay-at-home policies and more compulsory mask and travel policies in coping with the Delta variant (Period C v. Period A).** Firstly, given that stay-at-home orders are economically costly, there were fewer compulsory but more recommended C6 policies (solid red line and dotted red line, respectively) in Period C compared to Period A. Secondly, due to the low cost for people to wear masks, more provinces implemented compulsory facial covering policies (solid purple line). Thirdly, to cut off the cross-province transmission chain, more provinces implemented restrictions on internal movement (solid green line).
- (2) **More compulsory mask and travel policies for stricter baseline prevention and control in Autumn (Period D v. Period B).** As Figure 4 shows, more provinces implemented compulsory facial covering policies (solid purple line) and restrictions on internal movement (solid green line) in Period D than Period B. In other words, the variation of individual policy adoption represented by H6 and C7 reflects that after the second regional outbreak driven by the Delta variant in summer, a larger portion of the country was under stricter baseline prevention and control.
- (3) **More targeted compulsory policies to cope with multiple chains of epidemic transmissions and the emerging Omicron (Period E).** As the solid green line shows in Figure 4, a significantly higher escalation of restrictions on internal movement corresponds to the fourth epidemic wave, and the number of provinces adopting these policies remained above 20 in the fifth epidemic wave. Nearly all provinces immediately issued entry restrictions on people who had visited or lived in cities with medium-high risk areas to prevent the trans-provincial spread of the epidemic in November. However, despite facing a more complicated situation of the epidemic and the emerging Omicron variant, only five provinces with severe local outbreaks, such as Liaoning, Heilongjiang, Inner Mongolia, Hebei, and Shaanxi, required people not to leave their homes at the county or city level.^{27,28} This number is similar to the level of such restrictions in periods A and C. Moreover, over ten provinces such

²⁷ Beijing Youth Daily. The Zhuanghe county of Dalian city went into lock down. 2021. <https://baijiahao.baidu.com/s?id=1716384619205122271&wfr=spider&for=pc>

²⁸ BJNews. All communities (villages) and units in Xi'an will implement closed management. 2021. <https://mp.weixin.qq.com/s/ALttvE3-gDERZeTQmNaAPg>

as Beijing,²⁹ Hubei,³⁰ Hunan,³¹ and even Tianjin,³² where local transmission of the Omicron variant has appeared, saw very localized stay-at-home requirements within individual communities or even individual buildings.³³ These tightly concentrated restrictions do not appear in the figure above, which only record data at the county level or higher. In addition, some provinces adopted a new concept named "time and space companion"³⁴ to better accurately identify close contacts and apply more targeted test and quarantine measures.

²⁹ Beijing Daily. Changping, Beijing: In principle, people in the zone shall be quarantined at home, 2021. <https://baijiahao.baidu.com/s?id=1714292407021430419&wfr=spider&for=pc>

³⁰ Xinhua Net. Tianmen, Hubei: Strengthening epidemic prevention and control, 2021. http://k.sina.com.cn/article_2810373291_a782e4ab0200270ov.html

³¹ People's Government of Hunan Province. Changsha has built a safety net for epidemic prevention and control, 2021. http://www.hunan.gov.cn/hnszf/hnyw/jdt2/202110/t20211022_20842985.html

³² Gmw. Tianjin delimited new areas of containment, control and prevention zones, 2022. <https://m.gmw.cn/baijia/2022-01/08/1302754049.html>

³³ To avoid overestimating the stringency of government policy response at the state-wide level, we only code policies at or above the county level. For policies under the county level, we add notes in our database instead of changing coding values.

³⁴ If a cellphone signal has been within the same spatio-temporal grid (800m*800m square) with a confirmed case for more than 10 minutes and either signal has been within the grid for more than 30 hours, regardless of direct or indirect contact, the corresponding cellphone user will be identified as "time and space companion". Hongxing News. What is time and space companion, 2021. <https://baijiahao.baidu.com/s?id=1715530374098141770&wfr=spider&for=pc>

5. Learning from experience to tackle the Delta variant

This section explores the variation of epidemic severity and government response to recent Delta waves at the provincial level, especially the differentiated responses between provinces in Wave 4. We find that over time provincial outbreaks can be controlled in a shorter period, and that provinces with experience tackling previous Delta waves tended to apply less stringent and more targeted measures when facing subsequent outbreaks.

5.1 Severe Outbreaks at the provincial level since 2021

Looking at the five major national epidemic waves described in section 4.1, we compare the severity of provincial outbreaks in each wave, considering the number of cases at the peak date and the duration of outbreaks, defined as the number of days during which there are consistently more than 20 daily new cases in a particular province. The results show significant variation across provinces.

Table 4: Severe provincial outbreaks during national epidemic waves (wave defined as a period with >20 new cases/day for more than a week)

Time	Province	Peak Date	Peak Cases	Duration (In days)	Average Duration
Wave 1	Hebei	12/01/2021	90	17	16.7
	Heilongjiang	20/01/2021	68	19	
	Jilin	24/01/2021	67	14	
Wave 2	Jiangsu	05/08/2021	61	19	14.7
	Yunnan	19/07/2021	49	19	
	Henan	08/08/2021	41	6	
Wave 3	Fujian	16/09/2021	61	12	14.5
	Yunnan	15/09/2021	23	17	
Wave 4	Liaoning	13/11/2021	61	8	5.0
	Heilongjiang	03/11/2021	45	7	
	Inner Mongolia	26/10/2021	32	4	
	Hebei	03/11/2021	23	1	
Wave5	Shaanxi	27/12/2021	334	21	11.6
	Henan	11/01/2022	118	15	

	Inner Mongolia	30/11/2021	91	12	
	Tianjin	16/01/2022	80	8	
	Zhejiang	17/12/2021	77	9	
	Shanghai	14/01/2022	43	15	
	Guangdong	11/01/2022	27	1	

As depicted in Table 4, 14 provinces in China have experienced 19 relatively severe outbreaks since 2021, which include Hebei, Heilongjiang, and Jilin in Wave 1, Jiangsu, Henan, and Yunnan in Wave 2, Fujian and Yunnan in Wave 3, Inner Mongolia, Hebei, Heilongjiang, and Liaoning in Wave 4, and Shaanxi, Henan, Inner Mongolia, Tianjin, Zhejiang, Shanghai, and Guangdong in Wave 5. By calculating the average duration in each wave, we find that:

- (1) The average duration (roughly 16.7 days) in Wave 1 was nearly 63% more than that of the Delta waves (namely the Wave 2, 3, and 4 with an average of 10.3 days), suggesting that the pandemic was better controlled in the second half of 2021 than before. This improved performance is noteworthy given the Delta variant's greater transmissibility.
- (2) Comparison between each Delta wave showed that the average time needed for a wave to subside becomes shorter, from 14.7 days in Wave 2 and 14.5 days in Wave 3 to 5.0 days in Wave 4. Again, this pattern suggests improving effectiveness.
- (3) The resurgence of the Delta variant in Shaanxi and the introduction of the Omicron variant in Tianjin, Henan, and Shanghai elicited an increased average duration (11.6 days) in Wave 5. By 19 January 2022, the Omicron outbreaks in these three provinces have subsided with an average duration of 12.7 days.³⁵ While this is higher than the previous Delta waves, it differs from the first wave in early 2021.

5.2 Variation of provincial responses in Wave 4

We further investigate whether the provinces with prior experience coping with the Delta variant implemented significantly different measures in subsequent waves compared to those lacking experience. Focusing on 20 provinces with domestic cases in Wave 4,³⁶ we divided these provinces into two groups according to whether or not they experienced local outbreaks in Wave 2, because Wave 2 and Wave 4 were most comparable as the only two national epidemic waves caused by the Delta

³⁵ Beijing Youth Daily. What is the epidemic situation in different regions? Answer from the Health Commission, 2022. <https://www.163.com/dy/article/GUBET6OC0514R9KQ.html>

³⁶ We focus on domestic cases since the policy response of the local government is usually triggered by discovering the first case infected within China, rather than arriving directly from overseas, although a domestic case might be infected by an imported case. All incoming passengers in China are under closed-loop management with a low risk of spreading the virus. Therefore, a positive case among them usually does not affect policy responses directly.

variant and involving large-scale inter-provincial transmissions. Figure 5 shows the 12 provinces (Group A, red) that experienced local outbreaks in Wave 2 and the eight provinces (Group B, green) that did not.

Figure 5: Relationship between daily domestic cases and OxCGRT provincial stringency index

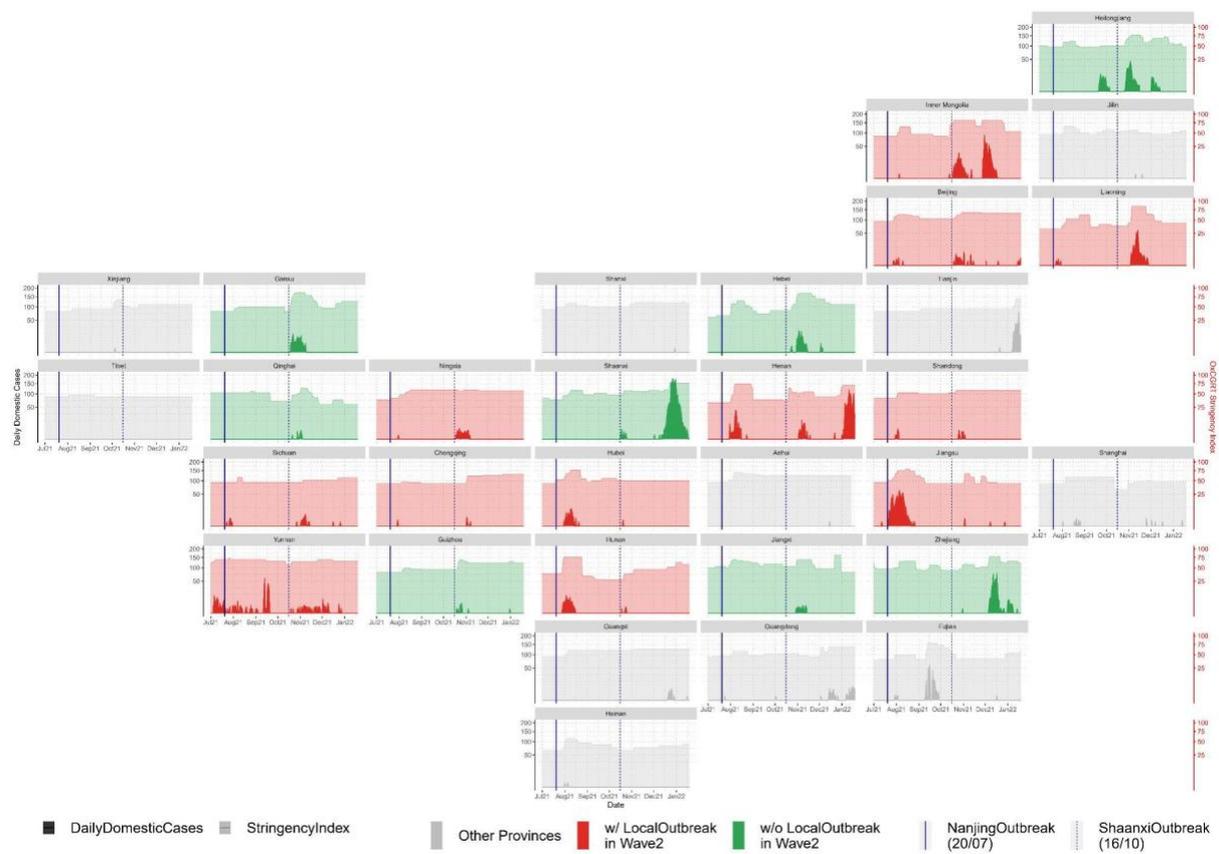


Table 5: Comparison of provincial response in Wave 4

	Province	Peak Daily Domestic Case (DDC)	Mean Peak DDC (±SD)	Peak SI	Mean Peak SI (±SD)	Days with SI > 60	Mean Days with SI > 60 (±SD)
Group A: With Local Outbreak in Wave2	Liaoning	60	12.5 (±17.3)	84.7	64.3 (±11.5)	16	12.7 (±15.1)
	Inner Mongolia	32		81.9		36	
	Henan	18		63.4		4	
	Beijing	9		73.2		34	
	Sichuan	7		57.4		0	
	Ningxia	6		58.8		0	
	Chongqing	4		66.7		17	

	Shandong	4		57.9		0	
	Yunnan	3		64.4		37	
	Jiangsu	3		67.1		8	
	Hubei	2		50.0		0	
	Hunan	2		46.3		0	
Group B: Without Local Outbreak in Wave 2	Heilongjiang	45	12.9 (± 15.1)	77.3	70.8 (± 10.9)	25	16.9 (± 12.2)
	Hebei	23		84.7		20	
	Gansu	17		86.1		31	
	Shaanxi	5		57.4		0	
	Guizhou	5		68.5		29	
	Qinghai	4		63.0		10	
	Jiangxi	3		70.0		20	
	Zhejiang	1		59.7		0	

Since the stringency of policy response is usually associated with the severity of outbreaks, we listed the peak daily domestic cases of each province to show the outbreak severity and calculated the mean of these peak numbers in each group before we compared the SI. Table 5 reveals that Group A and Group B shared close mean peak daily domestic cases, namely 12.5 and 12.9, suggesting that these two groups experienced a similar scale of local outbreaks in Wave 4. However, the mean of peak SI was 64.3 in Group A, while that in Group B was 70.8, meaning that provinces that had experienced an outbreak in Wave 2 showed less stringent responses in Wave 4. Moreover, although the means of days with new daily domestic cases were the same in the two groups (around 11 days), the mean of days with SI > 60 was 12.7 in Group A, lower than that in Group B (16.9 days).³⁷ These differences indicated that provinces with local outbreaks in Wave 2 applied comparatively less stringent policies yet still effectively controlled the spread of the pandemic.

A possible explanation for this between-group difference is that provinces with local outbreaks in Wave 2 have accumulated experience tackling the Delta variant and could address the latest wave with more targeted measures, whose granularity is lower than the minimum threshold of policy coding (i.e., county level). For example, Henan experienced a severe outbreak in Wave 2 with 41 daily domestic cases at the peak date, and its SI soared to roughly 74.5. While in Wave 4, though Henan's peak daily domestic cases ranked third in Group A, its SI plunged to 44.4 on the peak date. This abnormally low SI is owing to the same epicentre of these two local outbreaks. Zhengzhou, the capital of Henan province, locked down all communities, closed all non-essential places, prohibited all kinds of gathering activities, and suspended the operations of public transports at the city level after domestic cases were confirmed during Wave 2.³⁸ Nevertheless, it only applied the same measures in a specific town

³⁷ We select 60 as the threshold of high SI because Figure 3 reveals that the maximum provincial stringency index (max SI) has remained 60 or above in 2021, which means that SI>60 is a common reaction to local outbreaks.

³⁸ Gmw. A notice on further strengthening the control measures in Zhengzhou. 2021. <https://m.gmw.cn/baijia/2021-08/07/1302468242.html>

with confirmed cases while allowing gathering activities, opening entertainment places, and maintaining public transport in other areas during Wave 4.^{39,40}

However, the experience seems only to be accumulated through “real” local outbreaks. For example, Hebei did not experience a local outbreak in Wave 2, yet its SI at the peak date still surged to 72.6 during that period due to its adjacency to Henan. Nevertheless, Hebei’s SI still peaked at 84.7 in Wave 4, with the second-highest daily domestic cases in Group B.

³⁹ Bendibao. The latest news in Zhengzhou. 2021. <http://zz.bendibao.com/news/2021113/87506.shtml>

⁴⁰ Bendibao. The latest news in Zhengzhou. 2021. <http://zz.bendibao.com/news/2021114/87527.shtml>

6. Trends in vaccination and international travel policy

In light of the debate on when China might realise effective herd immunity and relax its strict border control, this section investigates the trends in vaccination and international travel policy in China and presents the latest progress. The emergence of the Omicron variant now introduces a significant additional factor into these questions, suggesting that further tracking of vaccine and travel policies will be needed to understand government responses to this new development.

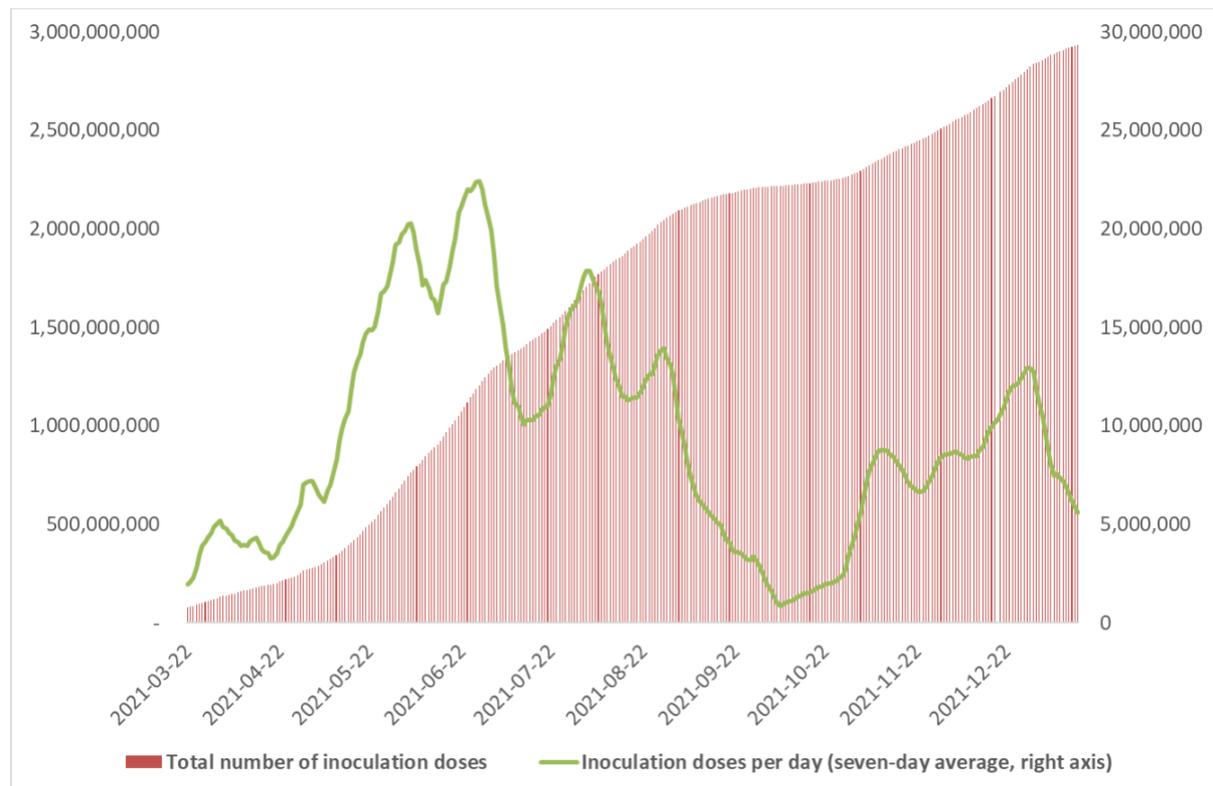
6.1 Vaccination progress in China

The Chinese government is strongly promoting COVID-19 vaccination, paralleling the implementation of NPIs to tackle the COVID-19 pandemic. On 30 December 2020, the first Chinese vaccine was approved from stage 3 trials, which signified the official start of the vaccine campaign with "fully approved" vaccines in China.⁴¹ While focusing on key workers, China started to roll out vaccines to the general public aged 18 and above and release information on vaccination progress daily from late March 2021.⁴² Figure 6 shows that the daily vaccination doses increased from April to June and peaked at more than 22 million doses per day in late June. In addition, we also observed that the progress of vaccination seems linked to local outbreaks. For example, there were significant increases in daily vaccination in late July and late October, corresponding to the second and fourth national epidemic waves illustrated in section 4.1. The reasons for this linkage might be the increase in people's willingness to get vaccinated or the speed-up of local authorities' vaccine campaigns during national epidemic waves.

⁴¹ Xinhuanet. Free for all! The conditional launch of China's first novel Coronavirus vaccine has instilled confidence in the global fight against COVID-19, 2020. <https://archive.vn/YQwc0>

⁴² Xinhuanet. The whole-population vaccination is coming! Our country will build a maximum immune barrier, 2021. <https://archive.vn/CV5SW>

Figure 6: Accumulative number of inoculation doses and daily inoculation in China⁴³



As for the vaccination coverage target, China set the goal of fully vaccinating more than 80% of people to pursue herd immunity from the Delta variant by the end of 2021, a target it has achieved.^{44,45} By 6 January 2022, 1.21 bn (86%) had been fully vaccinated, and more than 0.33 bn (23%) people had received booster shots.⁴⁶ Going ahead, the government will further promote booster shots and, especially, vaccination for older people. Of note, vaccination rates are relatively low for older people, with only about 50 % of those over 70 years old by 30 November 2021.⁴⁷

6.2 Variation in international travel policy

The international travel policy in China experienced several major adjustments from the beginning of the COVID-19 pandemic. With vaccination coverage

⁴³ National Health Commission of the People’s Republic of China, 2021. http://www.nhc.gov.cn/xcs/yqjzqk/list_gzbd.shtml

⁴⁴ Gmw. Zhong Nanshan: China can acquire herd immunity after more than 80% of people in China were vaccinated, 2021. https://tech.gmw.cn/2021-08/20/content_35097009.htm

⁴⁵ Full vaccination normally means vaccinating two doses (Sinovac or Sinopharm) or three doses (Zhifei Longcom) without the boost shot in China. Jiaodong Online. Please follow the correct procedure to get the best immunity, 2021. <https://baijiahao.baidu.com/s?id=1699975265916203740&wfr=spider&for=pc>

⁴⁶ Hongxin News. Zhong Nanshan says China has achieved herd immunity in theory. 2022. <https://baijiahao.baidu.com/s?id=1721273895090425920&wfr=spider&for=pc>

⁴⁷ Gmw. Only 50% of people over 70 in China have been vaccinated against COVID-19, 2021. <https://m.gmw.cn/baijia/2021-12/06/1302708632.html>

increasing steadily, China has gradually relaxed some entry restrictions on foreigners, but its overall stringency level of international travel policy remains relatively high.

- (1) On 28 March 2020, China temporarily stopped foreigners with valid visas and residence permits from entering China. After six months, foreign nationals holding valid Chinese residence permits for work, personal matters, and reunion were allowed to enter China with no need for applying for new visas onward from 28 September 2020.⁴⁸ In addition, the National Immigration Administration of China also issued stay and residence permits for 380,000 foreigners in China from January 2021 to June 2021.⁴⁹
- (2) As the epidemic worsened in some countries, from 4 November 2020, Chinese embassies in Britain, France, Belgium, Russia, the Philippines, India, and other countries issued notices, respectively, suspending personnel in these countries with valid Chinese visas and residence permits for work, private affairs and reunion from entering China.⁵⁰
- (3) In 2021, as Chinese-made COVID-19 vaccines were gradually introduced on the market, China's immigration policy has also begun to adjust. On 15 March 2021, the Chinese government confirmed that the visa application requirements for foreigners who had been vaccinated with the Chinese-made COVID-19 vaccine would be relaxed.⁵¹
- (4) According to the press conference held by the deputy director of China CDC on 21 March 2021, differentiated visa issuance based on vaccination percentage and epidemic status in different countries has been implemented,⁵² which means that China will develop different visa acceptance standards according to the specific conditions of different countries in the future. For example, people in Belgium who have received vaccines made in China and hold valid Chinese residence permits for work, personal matters, and reunion are allowed to enter China with no need for applying for new visas.⁵³ However, this convenience is not currently available to people in the UK and the US, which might be attributed to their epidemic

⁴⁸ National Immigration Administration. Announcement on Entry by Foreign Nationals Holding Valid Chinese Residence Permits of Three Categories, 2020. <https://www.nia.gov.cn/News/new/content.jsp?id=1355905>

⁴⁹ National Immigration Administration. Main data of immigration administration from January to June, 2021. <https://www.nia.gov.cn/n741440/n741567/c1431099/content.html>

⁵⁰ Global Times. Due to the epidemic, the Chinese Embassy has issued a notice suspending the entry of nationals from some countries, 2020.

<https://baijiahao.baidu.com/s?id=1682560732002877179&wfr=spider&for=pc>

⁵¹ Ministry of Foreign Affairs of The People's Republic of China. Foreign Ministry Spokesperson Zhao Lijian's Regular Press Conference on March 15, 2021, 2021.

https://www.fmprc.gov.cn/web/wjdt_674879/fyrbt_674889/202103/t20210315_9710963.shtml

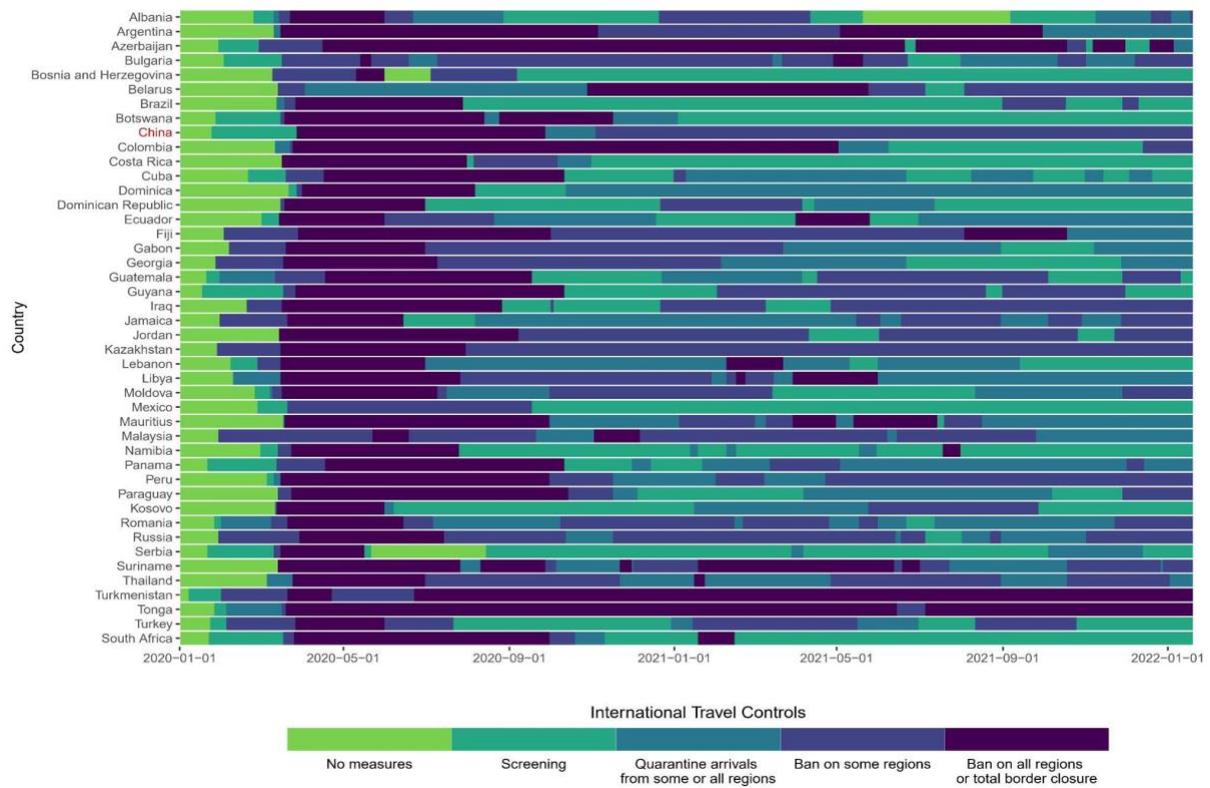
⁵² People's Daily. China CDC: Visa issuance will be differentiated according to the epidemic level of different countries, 2021. <https://baijiahao.baidu.com/s?id=1694841473689984964&wfr=spider&for=pc>

⁵³ Embassy of the People's Republic of China in the Kingdom of Belgium. Notification of facilitation for those who have received COVID-19 vaccine produced in China to travel to China, 2021. http://be.china-embassy.org/lsfw/lsfw/qz/fhqz/202103/t20210315_10171710.htm

situation.^{54,55} Thus, most residents of the UK and USA still can not apply for visas to enter China unless they have been vaccinated by China-made vaccines and plan for necessary productive or humanitarian activities in China. Considering the limited accessibility of China-made vaccines in many areas, a more relaxed requirement of the brand of the vaccine for visa applicants might be helpful and imperative in the future.

Figure 7 compares international travel policy between China and World Bank upper-middle-income countries (UMICs). While the international travel policies were relaxed from the most stringent level almost synchronously during the second half of 2020, China currently maintains a relatively stricter international travel restriction than most UMICs.

Figure 7: Comparison of international travel policy between China and World Bank upper-middle-income countries



⁵⁴ Embassy of the People’s Republic of China in the United Kingdom of Great Britain and Northern Ireland. Notification of visa facilitation for people vaccinated with COVID-19 vaccine produced in China, 2021. http://www.chinese-embassy.org.uk/qzfw/qz/zyxx/202103/t20210315_10260448.htm

⁵⁵ Embassy of the People’s Republic of China in the United States of America. Notice on visa facilitation for People who have been vaccinated against COVID-19 produced in China, 2021. http://www.china-embassy.org/lsw/zj/qz/202103/t20210316_9956666.htm

7. Conclusion

Based on the OxCGRT China Subnational Dataset, this paper presents some findings regarding the transition of Chinese government response patterns in tackling the Delta and Omicron variants since 2021, considering differentiated provincial responses and trends in vaccination and international travel policy in China.

The findings show that in coping with the Delta variant and the emergence of Omicron, China is maintaining the policy target of dynamic clearance while the response patterns have gradually transitioned along five stages since 2021: preventative measures in January, low baseline prevention and control from March to June, reactive response in July, high baseline prevention and control from August to October, and more targeted measures in November and December.

From the perspective of individual policies, local governments sought to implement fewer high-cost policies and improve the geographic precision of measures as they sought to maximize the benefits and minimize the costs of the “dynamic clearance” strategy. We find some evidence that provinces with experience of prior outbreaks were more successful in achieving transmission control with less stringent, more targeted measures, compared to provinces without prior experience.

Apart from NPIs, China has fully vaccinated more than 85% of people. The country is now working to promote booster shots for the general population and vaccination for older people. Meanwhile, China has gradually relaxed some entry restrictions, though its restrictions on international travel policy are still relatively high.

The OxCGRT China Subnational Dataset is a living, rich and unique dataset that enables academics, policymakers, and other stakeholders to conduct research around Chinese provinces' responses to COVID-19. We welcome scientific research that utilises this dataset to advance the world's understanding of the dynamics between policies and the pandemic in Chinese provincial-level jurisdictions, as well as the various social and economic impacts of government responses.