Comparing the COVID-19 Response and Impact in USA and China

Kaitao Deng

Curtin Singapore University, Singapore, 117684, Singapore

Abstract. This study presents a comparative analysis of the COVID-19 responses and their socioeconomic impacts in two innovation-driven regions: Silicon Valley, USA, and Shenzhen, China. Drawing on public health data, government reports, and secondary research, the paper evaluates the effectiveness of key interventions such as lockdowns, mass testing, vaccination programs, and healthcare capacity. While Silicon Valley adopted a relatively flexible strategy combining vaccination with targeted restrictions, Shenzhen implemented stringent containment under the zero-COVID policy. The findings highlight distinct trade-offs: Shenzhen achieved low infection and mortality rates through strong central coordination but at the cost of economic disruption, whereas Silicon Valley maintained a dynamic labor market and rapid recovery despite higher infection rates. The paper concludes with policy implications for balancing public health and economic resilience in future pandemics, emphasizing the need for adaptable strategies, healthcare investment, and support for vulnerable populations.

Keywords: COVID-19 response, public health policy, Comparative analysis, Socioeconomic impact, China–US relations.

1. Introduction

The purpose of this report is to make comparisons between the 2022 responses to the COVID-19 pandemic between Shenzhen, China, and Silicon Valley, California, by principally key aspects such as social influences, public health measures, and recovery measures. The effective of government responses as mediated through the levels of such measures as public health orders, testing, and vaccination measures will be examined by the analysis. The government reports of the two places will be the basis of comparing the daily trends of confirmed cases, cases and fatalities, and vaccination. The report will give about how the two places overcame the challengenby the pandemic, respective measures taken by them, and lessons for the next time.

2. Regional Profiles

2.1. Silicon Valley, California

2.1.1. Population

The population of Silicon Valley was also going through significant changes in 2022 as a result of the COVID-19 pandemic. The area lost about 38,900 residents between mid-2020 and mid-2021, representing the largest recorded drop (Doran, 2023). The cause of this decline was a 74% boost in domestic outmigration, a reversal of foreign immigrants' net flow, the slowing of birth rates, and the increasing of death rates. The population started to recover about the time the pandemic did. The population of Santa Clara County hit almost 1.92 million by 2024, indicating a possible turning point (Pawlowska, 2025).

2.1.2. Healthcare Infrastructure

In 2022, the COVID-19 pandemic dealt a severe blow to Silicon Valley's medical infrastructure. The epidemic has led to a sharp increase in the number of patients, exerting tremendous pressure on medical institutions and increasing waiting times. Santa Clara Valley Medical Center reported over 216,000 patients daily, while El Camino Health reported over 103,000 patients daily (Revis, 2023). Sartre Health has invested 800 million US dollars in the outpatient medical campus to relieve the

pressure on the emergency room. Despite this investment, health access inequality still exists and has exacerbated the shortage of personnel due to new technologies (Jennings, 2024). These challenges indicate that continuous investment in the healthcare system is necessary.

2.2. Shenzhen, China

2.2.1. Population

In 2022, Shenzhen's population continued to grow rapidly, with a total permanent resident population of approximately 17 million. This city has gathered diverse immigrants from all provinces of China, making its population structure vibrant (Cheng et al., 2023). Despite its young population, Shenzhen still faces pressure on infrastructure and public services during its rapid expansion (Brief, 2022). In 2021, Shenzhen strengthened its household registration system by increasing the difficulty of obtaining household registration within the city to regulate population growth.

2.2.2. Healthcare Infrastructure

Shenzhen's medical infrastructure reached its limit in 2022 due to the continuous demand from the COVID-19 pandemic. The city implemented strict lockdown measures and large-scale testing activities to curb the spread of the disease, exerting tremendous pressure on its health system (Chen et al., 2024). Meanwhile, Shenzhen continues to build new medical facilities and upgrade existing hospitals. Initially, there were urban-rural disparities in the provision of medical services in Shenzhen, as well as challenges in the family affairs of the migrant population.

3. 2022 COVID-19 Case

3.1. Silicon Valley, California

3.1.1. 2022 Cases and Deaths

In 2022, the number of COVID-19 cases in Silicon Valley soared. By the end of the year, the total number of confirmed cases exceeded 1.2 million. The death toll in the region was approximately 1,500, mainly concentrated the unvaccinated population (Silicon Valley Indicator, 2022). The Omicron variant led to a sharp increase in cases at the end of winter. Despite the large number of cases, the medical system was still able to maintain its capacity due to the wide availability of vaccines and booster shots.

3.1.2. Case Incidence Rates per 100,000 People

The case rate in the Silicon Valley area fluctuated during 2022, peaking at the peak of the winter pandemic. By the end of the year, approximately 14,670 cases were recorded per 100,000 people in the region (Silicon Valley Indicator, 2022). Although the incidence rate in this region is lower than the state average, it is still higher than the national average due to effective public health measures and the vaccinated population. Evidence shows that although the incidence rate is higher than the normal level, but the medical system can meet the increased demand without overburdened.

During the entire peak of the Omicron epidemic, that is, in early 2022, the number of hospitalizations in the county exceeded 1,000, among which approximately 200 required intensive care. The medical system in this region responds by expanding bed capacity and implementing emergency measures (Eby, 2025). By the middle of 2022, the hospitalization rate had declined to a manageable level. Thanks to effective planning and resource management, medical institutions in this region have been able to maintain their operations smoothly.

3.2. Shenzhen, China

3.2.1. Cases and Deaths

As of February 21, 2022, Shenzhen has reported a total of 417 confirmed cases of COVID-19. The government has implemented strict lockdown measures, including large-scale screening and restrictions on personnel movement, to curb the spread of the virus (SZ, 2022). The number of cases

this time is rather small by world standards. It is said that the death toll in Shenzhen is very low. During this period, no case of COVID-19 was reported as a major death.

3.2.2. Case Incidence Rates per 100,000 People

Due to the small number of confirmed cases, the incidence rate in Shenzhen was very low in 2022. There are approximately 2.4 cases per 100,000 residents, a figure that is very low by international standards. This is a successful demonstration of the city's strict public health measures, including large-scale testing, contact tracing and isolation (SZ, 2022). At that time, the relatively low incidence rate in Shenzhen was a sign of the success of China's "Zero-COVID" policy.

3.2.3. Hospitalization and ICU Capacity Data

The medical system in Shenzhen is well-prepared for the possible outbreak of the novel coronavirus. The city has sufficient hospital beds and intensive care unit (ICU) capacity to accommodate patients. In the first half of 2022, there was no evidence of overcrowding in hospitals or intensive care units (Ba et al., 2023). The preventive measures taken by the municipal government, such as the establishment of temporary medical institutions, help maintain the stability of the medical system throughout the year.

4. Government Responses and Public Health Measures

4.1. Silicon Valley, California

4.1.1. Public Health and Restrictions

In 2022, the Bay Area Health Officials Association (ABAHO), which includes Santa Clara County, coordinated health measures in Silicon Valley. The region reimplemented the indoor mask-wearing rule in August 2021 as the number of COVID-19 cases rose again and this rule persisted throughout 2022 (Public Health, 2024). San Francisco requires indoor restaurants and entertainment venues to provide proof of vaccination starting from October 2022, and the same applies to neighboring counties such as Santa Clara.

Santa Clara County offers free COVID-19 testing and treatment services and ensures that all residents, including the uninsured, have access to these services (Public Health Department, 2024). The county's health department has given recommendations on the respiratory virus program and updated information on the availability of testing and treatment.

4.2. Shenzhen, China

4.2.1. Public Health and Restrictions

Shenzhen implemented strict lockdown measures in March 2022 to deal with the most severe outbreak since the Wuhan epidemic (Davidson, 2024). The characteristics of this lockdown are the closure of enterprises and the suspension of public transportation, as well as mandatory testing of residents. These measures are part of China's larger-scale "Zero-COVID" policy, aiming to eradicate the virus through strict restrictions.

Shenzhen has launched a large-scale testing campaign, and residents have undergone multiple rounds of nucleic acid testing. The city has also introduced a new framework for COVID-19 prevention and control, adjusting measures based on the intensity of the epidemic in each district (Davidson, 2024). These measures are part of a larger-scale plan in China to control the spread of the novel coronavirus through extensive screening and contact tracing.

Shenzhen launched the COVID-19 vaccination program in 2022 as part of China's national immunization efforts. The city is vaccinating eligible people to boost immunity and thereby mitigate the impact of the COVID-19 pandemic (Davidson, 2024). The vaccination campaign is in line with China's overall health policy to control the spread of diseases.

5. Socio-economic impact

5.1. Silicon Valley, California

5.1.1. Employment Trends and Economic Effect

The unemployment rate in Silicon Valley remained at 2.1% throughout 2022, reflecting the strength of the labor market. The region has been affected by extensive layoffs at companies such as Meta, Amazon and Google (Doran, 2022). The reason for the layoffs is excessive recruitment during the recovery from the epidemic and the shadow of the economic recession. The overall economy has demonstrated resilience, with the number of employed people increasing by more than 218,800 compared to April 2020.

5.1.2. Impact on Low Wages and Workers

Low-wage workers in the Silicon Valley area, including delivery personnel and retail staff at grocery stores, have faced increased risks during the pandemic. Studies show that these workers are exposed to higher levels of COVID-19 infection in areas and COVID-19-related health problems (Chowdhury et al., 2022). In addition, due to the pressure of working conditions during the epidemic, workers are also facing greater stress and mental health problems.

5.1.3. Educational and Remote Learning

In 2022, the transformation of distance education driven by the pandemic presented numerous challenges to students in Silicon Valley. The lack of necessary technology and Internet connection among students has exacerbated educational inequality (McKinsey & Company, 2024). In response, institutions like Silicon Valley educational institutions have shifted to online teaching and provided students with courses and services such as TEAM and ZOOM during the peak of the pandemic.

5.2. Shenzhen, China

5.2.1. Employment Trends and Economic Effect

In 2022, Shenzhen's economy suffered a major blow due to strict COVID-19 prevention and control measures, including lockdowns and travel restrictions (Cash, 2023). These measures have led to a decline in the number of employed people in cities. Despite these challenges, the labor productivity of this city still increased by 5.7% compared with the previous year.

5.2.2. Impact on Low Wages and Workers

During the epidemic, low-wage workers have been in an unstable working environment. Many people were recruited as temporary sanitation workers and worked under harsh conditions (Feng, 2022). These workers have been deprived of job security, life safety and social welfare, reflecting the helplessness and vulnerability of urban low-wage workers.

5.2.3. Educational and Remote Learning

Shenzhen imposed a city lockdown in March 2022, suspending face-to-face classes and adopting online teaching. This poses a challenge for students, especially those who cannot access appropriate online tools and stable networks (Zhu et al., 2022). The "No classes, no learning" plan launched by the government attempts to make up for educational losses, but it has also raised concerns about electronic devices.

6. Conclusion

6.1. The Impact of Public Health Facilities

Public health intervention measures were effective. Silicon Valley and Shenzhen responded to the COVID-19 pandemic in different ways in 2022. Silicon Valley has adopted a balanced approach, incorporated vaccination and screening while implementing regional restrictions to leave room for

both businesses and citizens. Shenzhen has adopted a more stringent lockdown strategy under its zero-COVID policy. Although the policies in Shenzhen are stricter, those in Silicon Valley are more flexible, maintaining economic activities with minimal impact. Strategic management in Silicon Valley is easier to adapt to and recover from.

6.2. Socio-Economic Recovery

The economic performance of Silicon Valley has been very strong. In the face of challenges such as the pandemic in 2022, the technology industry led the recovery. The region's ability to attract technical talents, its response to remote work, and its support for leveraging cutting-edge technologies have accelerated its recovery process. Shenzhen strictly adheres to the medical management model to prevent the spread of the virus. As a result, it has implemented multiple lockdowns, disrupting economic development. The measures taken in Shenzhen have ensured the minimum impact on public health, thereby sacrificing some economic development. Silicon Valley, on the other hand, flexibly balances the economy under limited conditions.

6.3. Recommendations for Future Pandemic

To better cope with the future, it is necessary to continue researching innovations in Silicon Valley, while improving the availability of healthcare on a fairer basis and narrowing the gap exposed during the pandemic. It is also necessary to enhance the resilience of key industries such as healthcare and logistics. Although the strict restrictions in Shenzhen have helped to control the epidemic, more flexible and balanced response measures should be considered next time to reduce economic turmoil.

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