COMMUNITY SAFETY FOR PUBLIC TRANSPORTATION DURING COVID-19 PANDEMIC

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ABSTRACT

Introduction: In the face of a pandemic, urban public transport has the dual responsibility of ensuring travel and blocking the epidemic. The normal operation of public transportation is often linked to the economic development of the society. Therefore, it is very important to ensure the safe travel of people during the pandemic period. This is also a major livelihood problem that the government and public transportation management departments urgently need to solve. challenge.

Objective: This study aims to investigate the community safety of public transportation during Covid-19 pandemic

Methods: This study collects public transportation data during the COVID-19 pandemic, analyzes the importance of public transportation community safety to social development, and how many people affect as a result. Develop new guidance on public transport safety during a pandemic or future outbreak based on an analysis of China's public transport epidemic prevention and control measures against Covid-19 and public transport response to the pandemic

Results: The outbreak of Covid-19 in China coincided with the Chinese Spring Festival, and the passenger volume of public transport in the whole society dropped by 75.2% compared with the same period. About 850 million people affected during this period. Established a public transport epidemic prevention and control system, and established

a three-level epidemic prevention and control strategy guide for public transport.

Conclusion: In order to restore and enhance social development, it is critical to keep the public transportation community safe in the context of COVID-19, and to this end develop new guidance on public transportation safety during a new pandemic or future outbreak. A three-level epidemic prevention and control strategy guide and a diversified group prevention and control mechanism have been constructed.

Key words: COVID-19; Epidemic prevention system: Public transportation; Safety

KESELAMATAN KOMUNITI UNTUK PENGANGKUTAN AWAM SEMASA PANDEMIK COVID-19

ABSTRAK

Pengenalan: Dalam menghadapi pandemik, pengangkutan awam bandar mempunyai dua tanggungjawab untuk memastikan perjalanan dan menyekat wabak tersebut. Operasi biasa pengangkutan awam sering dikaitkan dengan pembangunan ekonomi masyarakat. Oleh itu, adalah sangat penting untuk memastikan perjalanan orang ramai selamat semasa tempoh pandemik. Ini juga merupakan masalah mata pencarian utama yang kerajaan dan jabatan pengurusan pengangkutan awam perlu segera diselesaikan. cabaran.

Objektif: Kajian ini bertujuan untuk menyiasat keselamatan komuniti pengangkutan awam semasa pandemik Covid-19

Kaedah: Kajian ini mengumpul data pengangkutan awam semasa pandemik COVID-19, menganalisis kepentingan keselamatan komuniti pengangkutan awam kepada pembangunan sosial dan bilangan orang yang terjejas akibatnya. Membangunkan panduan baharu tentang keselamatan pengangkutan awam semasa wabak atau wabak masa depan berdasarkan analisis langkah pencegahan dan kawalan wabak pengangkutan awam China terhadap Covid-19 dan tindak balas pengangkutan awam terhadap wabak itu

Keputusan: Wabak Covid-19 di China bertepatan dengan Festival Musim Bunga Cina, dan jumlah penumpang pengangkutan awam di seluruh masyarakat menurun sebanyak

75.2% berbanding tempoh yang sama. Kira-kira 850 juta orang terjejas dalam tempoh ini. Mewujudkan sistem pencegahan dan kawalan wabak pengangkutan awam, dan mewujudkan panduan strategi pencegahan dan kawalan wabak tiga peringkat untuk pengangkutan awam.

Kesimpulan: Untuk memulihkan dan meningkatkan pembangunan sosial, adalah penting untuk memastikan komuniti pengangkutan awam selamat dalam konteks COVID-19, dan untuk tujuan ini membangunkan panduan baharu tentang keselamatan pengangkutan awam semasa wabak baharu atau wabak masa depan. Panduan strategi pencegahan dan kawalan wabak tiga peringkat dan mekanisme pencegahan dan kawalan kumpulan yang pelbagai telah dibina.

Kata kunci: COVID-19; Sistem pencegahan wabak: Pengangkutan awam; Keselamatan

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WHO	World Health Organization
Covid-19	Coronavirus disease 2019
SARS	Severe acute respiratory syndrome

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CHAPTER 1: INTRODUCTION

1.1 STUDY BACKGROUND

Infectious diseases are diseases caused by various pathogens that can spread from person to person, animal to animal, or human to animal. According to the World Health Organization (WHO), there have been 10 major outbreaks in human history, including smallpox, black plague, AIDS, dengue and West Nile fever, SARS, cholera, Ebola, schistosomiasis, avian influenza, and polio (also known as polio). "The top 10 infectious disease outbreaks include Nile fever, SARS, cholera, Ebola, schistosomiasis, avian influenza, and polio. In recent years, there have been major infectious disease outbreaks around the world, such as the Middle East Respiratory Syndrome coronavirus infection outbreak, the Campylobacter infection outbreak, and the new coronavirus-infected pneumonia (COVID-19) outbreak, which have endangered the lives and health of many people.

In this case, the first case was found in Wuhan, China, and China subsequently faced an explosive spread of the epidemic, which was controlled as quickly as possible. This study is dedicated to the public transportation situation under the new coronavirus epidemic in China as an example. In the early stages of the epidemic, preventive and control measures such as extended Spring Festival holidays and home quarantine were commonly taken throughout China to avoid large-scale population movements and

gatherings, but with the resumption of production and work and the return of university students and the opening of primary and secondary schools, urban epidemic prevention and control will face a severe test. The transportation system is the foundation of urban production and life, emergency rescue and epidemic prevention and control, and there is a risk of further spreading the epidemic due to the concentration and transition of people in transportation and transportation places. In the face of a major epidemic, urban public transportation must not only ensure effective transportation, but also reduce the risk of spreading the epidemic. In the face of the COVID-19 epidemic, the public transportation operation strategy needs to be emergency response to ensure people's rigid travel needs while interrupting the spread of the epidemic and achieving control of the epidemic. To actively respond to the COVID-19 epidemic, public transportation has taken many routine measures to prevent the epidemic, such as closed management, mask and glove protection for passengers, dispersed seating of passengers in cars, and 24/7 disinfection of stations, which have played a great role in effectively preventing the epidemic. With the arrival of the post-holiday wave of returning to work and the start of school, a large amount of rigid travel demand is revived, and public transportation, as a basic public service, should not be stopped or interrupted. In the current complex situation of epidemic prevention and limited public transportation capacity, how to effectively cope with the multiple pressures of enterprises returning to work and production, students returning to school and normal commuting after the holidays, and to protect the rigid travel needs of the public is a major livelihood issue

and a huge challenge faced by urban public transportation management departments.(Zhou, Jibiao *et al.*, 2020)

1.2 PROBLEM STATEMENT

The spread and spread of pandemic will undoubtedly have a huge impact on cities with centralized residents and community-based management, and the characteristics of multiple public transportation points, long lines, wide coverage, dense passenger flow, and closed spaces are even more deadly. A little carelessness can easily become a means of transmission of the disease, leading to serious consequences of large-scale, multi-regional, and mass cross-infection.(Tan xiao dong et al.,2003)

As major public health emergencies occur in community traffic, they have strong spread, low probability, but extremely harmful and adverse health impact to the community which directly and indirectly will affect the country's economic as well. . How to prevent them in advance and minimize the probability of occurrence is very important to protect the health and safety of citizens to the greatest extent.

Therefore, studying the prevention and control of public transportation during pandemic will significantly improve to public health, and has positive scientific significance and practical value for ensuring social stability and harmonious development with less economical loss.

1.3 RESEARCH SCOPE

In the context of the COVID-19 pandemic, this study will provide a new style of

guideline to address community safety in public transportation, as well as analyze the value of public transportation to social development and clarify the importance of community safety in public transportation. Simultaneously, it will assess how many individuals are affected by the epidemic-related suspension of public transportation.

1.4 OBJECTIVIES

1.4.1 Main objective:

To study the Community Safety for public transportation during Covid-19 pandemic

1.4.2 Specific Objectives

1）To explore the importance of transportation to social development

2）To determine the reduction of public transport data during Covid-19 pandemic

3）To prepare a new guideline on public transportation safety during pandemic or any outbreak in future

1.5 Significant of study

This study will benefit government officials as well as the general public. It provides a new public transportation epidemic prevention system during a pandemic, better instructions on how people can safely use public transportation, and also provides a new way for the government to take public transportation. ideas.

The safety of public transportation is related to the life and health of the public, and is

also related to the economic development of the society. In addition, public transportation is also related to the success or failure of the entire epidemic prevention and control work.

1.6 thesis outline

Figure 1.1 provides a brief overview of the chapters and processes of this research report. After the introduction, the second chapter introduces the new crown epidemic, SARS epidemic and public transportation, literature review of Chinese defense related literature under the new crown epidemic, the third chapter introduces the method of this study, and the fourth chapter introduces the results. Chapter 5 summarizes the conclusions drawn.

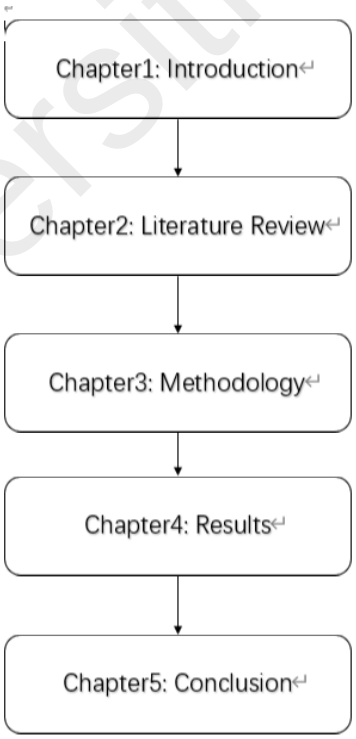

Figure 1.1 thesis outline

CHAPTER 2: LITERATURE REVIEW

2.1 Impact of Covid-19 on public transport

The epidemic of COVID-19 must have three basic components, namely, the source of infection, the transmission route and the susceptible population. The measures to prevent the spread of COVID-19 are mainly to control the source of COVID-19 infection, to cut off the transmission route of COVID-19 infection and to protect the susceptible population. Currently, COVID-19 epidemic prevention and control strategies include : (1) treatment and medical observation of confirmed cases; (2) drug control measures such as development of effective drugs and vaccines; and (3) isolation measures; (4) routine practical epidemic prevention (e.g., temperature testing, protective masks, window ventilation, daily disinfection, and safety education); (5) school closure; and (6) traffic control (blocking traffic and preventing the spread of COVID-19). (6) traffic control (traffic interruptions, traffic closures) and other preventive and control measures. These measures have played a positive role in stopping the spread of the virus and the spread of the epidemic.(HUANG C et al., 2020 ; CHEN N et al., 2020 ; ZHU N et al., 2020)

The results on the prevention and control of COVID-19 epidemic are mainly in the fields of Epidemiology, Virology, and Medicine. In addition to the above three fields, there have been many studies on virus transmission in public transportation,

especially in the fields of rail transportation, aviation , and transportation network modeling.

In the case of rail transit, Cooley et al extrapolated the 1957-1958 New York epidemic and found that 4.4% (114,031) of the 2.6 million cumulative infections came from the subway, with commuters accounting for 3.6% and non-commuters for less than 1%. The results indicated that interventions targeting subway passengers were not effective in curbing the development of infectious disease epidemics (COOLEY P, 2011); Xiong et al analyzed the effect of passenger flow on the transmission rate of rail transit congestion with the help of SIR (Susceptible Infected Recovered) infectious disease model(XIONG, 2018); Zhang Qi et al constructed a model for the transmission of infectious diseases under heavy rail transit congestion using metacellular automata. Zhang et al used metacellular automata to construct a model for the spread of infectious diseases under heavy rail traffic congestion. (ZHANG QI, 2017)

In aviation, Wang used computational fluid dynamics (CFD) to perform computer simulations of how air moves on an aircraft and found that when a passenger sneezes on an aircraft, the airflow actually contributes to the transmission of pathogens to other passengers (WANG,2017); Weiss et al investigated the effect of cabin crew's random walking on the infection rate of passengers. It was found that

38% of passengers left their seats once, 24% left more than once, and 38% remained in their seats during the 3.5 to 5 hour flight duration. The average number of passengers exposed by the window was 12, while in the middle and aisles the average number of contacts was as high as 58 and 64(WEISS H, 2019); Mangili et al. found that passengers seated two rows in front and behind the source of the virus were at risk of transmission. However, during the SARS outbreak, cases of passengers outside two rows were also found to be infected .(Mangili A, 2005)

In transportation network modeling, pathogens and their vectors are spreading farther, faster, and in greater numbers than ever before as the coverage, travel speed, and passenger capacity of the three major transportation networks by land, sea, and air continue to expand (TATEM A ,2006). For example, to analyze the spread of avian influenza (H7N9), Zhang et al constructed an avian influenza transmission model from poultry (including poultry farms, backyard poultry farms, live poultry wholesale markets and markets) to humans based on avian transport networks. The results suggest that closing retail live poultry markets is a feasible prevention and control measure under appropriate conditions; similar to the poultry transport network, the same is true for the socialized network of the global population (ZHANG J, 2018). By analyzing the existence and stability of disease-free equilibrium points and positive equilibrium points of the model, Li Zengguang et al found that population movement would make cities with more developed

transportation have more infected people and more likely to contribute to disease outbreaks (LI , 2017); Zhang Yu et al proposed a Markov chain-based model for the dynamic transmission of infectious diseases in transportation networks and found that the Markov chain model could better Ni Shunjiang analyzed the impact of infectious disease transmission in terms of the evolutionary behavior, formation mechanism, structural characteristics and individual behavior patterns of social contact networks. (ZHANG Yu, 2017; NI, 2009) In addition, Sheng Liu et al analyzed the characteristics of infectious disease transmission and proposed route planning solutions for various modes of transportation by analyzing the characteristics of agent-based travel route planning (LIU, 2010); Hackl et al simulated seasonal influenza in Zurich, Switzerland based on an agent model, which reproduced the daily real behavior of individuals in the urban environment and captured their interactions in the form of spatio-temporal social networks. capturing the process of their interactions. (HACKL J, 2019)

2.2 Impact of SARS virus in China

The 2003 SARS was a public health "catastrophe" in China, and the tourism industry and the transportation of passengers were the first to suffer huge losses (HU AG, 2003). Zhu Yingbo et al. used the ARIMA model to predict the impact of SARS on the number of inbound tourists in China (ZHU YB et al., 2003), Zeng Benxiang et al. analyzed the damage caused by SARS to China's inbound tourism

and the different recovery cycles of the crisis (ZENG BX, 2005), and Zhang Guangrui et al. analyzed the impact of SARS on China's public development using the adjacent year comparison method . (ZHANG GR et al., 2004).

Wu Culture et al. analyzed the impact of SARS on China's transportation and passenger transport by using the same period of adjacent years to analyze the losses caused by SARS on four major transportation systems: road, rail, water and air, and the recovery situation of China's passenger transport industry after the crisis.
He also analyzed the recovery situation of China's passenger transportation industry after the crisis. (WU WH, 2003)

Sun Gennian proposed that the SARS transportation passenger transportation crisis has four life cycles, the gestation and growth period, the full-blown period, the abatement and recovery period and the rebound compensation period, but the rebound compensation period after the crisis has never appeared. According to the SARS crisis, the passenger transportation losses of each province in China were divided into four levels. Among them, four provinces, Guangdong, Sichuan, Hebei and Henan, had the largest passenger traffic losses, ranging from 89 to 172 million passengers in 2003, and were the "hardest hit" by the SARS traffic and passenger traffic crisis; six provinces and cities, Beijing, Shandong, Hunan, Liaoning, Anhui and Chongqing, had larger losses, ranging from 40 to 70 million passengers;

Guangxi The losses were smaller in eight provinces and autonomous regions, Guangxi, Inner Mongolia, Fujian, Yunnan, Heilongjiang, Zhejiang, Shaanxi, and Guizhou, with 20-40 million passengers; the losses were smallest in 10 provinces (cities) and autonomous regions, Hubei, Jiangxi, Xinjiang, Jilin, Shanxi, Shanghai, Gansu, Ningxia, Tianjin, and Tibet, with less than 20 million passengers (SUN GN, 2006).

2.3 The Chinese Government's Response Under Covid-19

2.3.1 Public health interventions

Pan's study analyzed the impact of the epidemic through the policy in Wuhan. (Pan et al, 2020) This paper analyzed 32583 confirmed cases in Wuhan by age, sex, and five time periods. Finally, it was found that the elderly and children were more susceptible to transmission. Although the rate of the disease was higher in women than in men, the risk ratio was higher in men than in women. More importantly, hospitals did not realize the severity of COVID-19 until the second period (when the number of infections increased rapidly). In the third period, the government immediately implemented a policy of urban lockdown, social isolation, home isolation, and centralized quarantine. Although there was a short-term increase in the number of infections after the policy was implemented, the number of newly diagnosed patients began to decline significantly after February 2.

2.3.2 Control of population movement

In Xu's paper, the authors tracked epidemic data from the official Chinese website on a daily basis from January 11, 2020 to June 6, 2020. These include: policies and measures implemented by the government, and statistics on relevant cases. The data were then collected and analyzed. (Xu et al. 2020) The article notes that in the first few days, the government increased surveillance, isolation, and disinfection, raised citizen awareness, communicated with other countries, performed RNA sequencing, and established shared PCR surveillance reagents. During these five months, the government made seven revisions to the diagnosis and management of COVID-19. As of January 27, 18 cities across the country have been locked down and are under 24-hour closed community management. Daily supplies are uniformly provided by the government. Communities implement strict policies such as temperature measurement, personnel tracking and home isolation. The government strictly prohibits any assembly, work and school activities. All Chinese language group tours are suspended, and all forms of testing, training and instruction are conducted online. And public places and streets were disinfected regularly. The government set up two large medical facilities ("Vulcan Mountain" and "Thunder Mountain") in 14 days and opened them in early February. The government urged state-owned enterprises to resume work on January 22. On February 22, the supply of N95 masks increased from 36,000 to 300,000 per day in Hubei province alone, and on April 1, the China Foundation received over 2.1 billion yuan in donations and 1,140.8 million yuan in government grants. Finally, at the end of

March, China overcame the difficult period of the sub-epidemic.

Thus, the Chinese approach (including active case surveillance, rapid case diagnosis and quarantine, rigorous follow-up and isolation of close contacts, and issuance of guidance to help the public understand and comply with control measures) and rapid and effective high-level decision making, with full activation of the public health system and full participation of society, has been effective in preventing and controlling COVID-19

2.3.3 Responses, challenges and implications for health systems

Xing's literature expresses a similar view to Xu's, but Xing adds that in the first three weeks of January 2020, dozens of cases were confirmed, but relevant government and medical personnel underestimated the risk of transmission and concealed the news, and the situation in Wuhan was completely out of control. Although the government implemented an immediate response, early recognition of the seriousness of COVID-19 and early disclosure of information would have given Wuhan sufficient capacity to stop the spreading epidemic in its initial stages. Meanwhile, in the early stages of the epidemic, many countries underestimated the severity of the epidemic and the associated benefits in order to consider human rights, and failed to achieve effective prevention and control, leading to the rapid spread of the epidemic. (XING , 2020)

2.3.4 Public Engagement during the New Crown Outbreak

Chen Wenhui mentioned that Chinese social media has over 430 million monthly active users on Sina Weibo and over 1 billion active users on WeChat. Therefore, social activities, media information through these social media, residents began to convince children and parents how to reduce the risk of virus infection through hand washing, disinfection and masks. Free accommodation was opened in the affected areas and the Chinese people began to organize voluntary donations and set up volunteer associations. Medical staff on leave volunteered to return to work, and infrastructure staff independently contributed to the construction of "Vulcan Mountain" and "Thunder Mountain. Residents monitored each other and shared information resources. (Chen, 2020) Wu's report surveyed 19,816 data and found that Chinese citizens' satisfaction with government policies is generally high, but declines as their satisfaction with government declines. (Wu et al, 2021)

CHAPTER 3: METHODOLOGY

3.1 Study area

Since both the SARS virus and the new coronavirus broke out in China, and caused a huge impact on China's transportation and economy, we took the overall public transportation situation in China as the study area

Figure 3.1 Study area

3.2 Study design

This study will collect and investigate the impact of the pandemic on public transportation, collect epidemic prevention measures and establish safety guidelines for public transportation during the pandemic

3.3 Reading literature

Gather China's epidemic prevention and control measures by searching for literature

related to research objectives

3.4 Data collection

3.3.1 Data collection on public transport during the pandemic

Collect the impact of the pandemic on public transportation during the COVID-19 pandemic on the official Chinese government website, and analyze the importance of public transportation to socioeconomic development and the consequences for people.

3.3.2 Inclusion criteria

- Covid-19 data from China
- Various types of public transport under the pandemic
- Data and policies published by the government

3.4 DATA MANAGEMENT

3.4.1 DATA ENTRY

This study uses secondary data released by the Chinese government, and due to the Chinese government's strict scrutiny of data and documents, some specific data and policy documents cannot be fully displayed.

3.4.2 Summary derivation

Summarize the existing epidemic prevention and control measures and policies, improve it according to your own thinking, and formulate a public transportation prevention and control system to deal with possible future epidemics and public health epidemics of other infectious epidemics.

CHAPTER 4: RESULT AND DISCUSSION

4.1 The importance of transportation to social development

4.1.1. The link between public transportation and social and economic progress

The urban population grows as the economy grows, and the city's scope extends. Due to its advantages of fast speed, large capacity, safety, and punctuality, urban rail transit plays a huge role in the growth of satellite towns and the development of key cities to urban agglomerations and the development of cities to their advanced urban belts. The core city's radiation impact on the surrounding area is strengthened, the central area's vitality is preserved, and the transformation of a single-centre city to a multi-centre city is aided by the development of rail transit. This is one of the reasons why several car-centric countries have begun to alter their transportation strategies toward public transportation and the rebuilding and development of rail infrastructure. On the other side, city expansion, particularly urban transportation development, has encouraged rail transit to play a larger role in the urban passenger transportation system. Higher requirements for urban transportation have been put forward as a result of the economic expansion of the world's major cities and changes in the urban regional organization. To address the transportation needs of large cities, large cities urgently need to develop a multi-level, three-dimensional comprehensive public transit system. The single conventional public transit system is not ideal for long-distance and high-volume passenger transportation, and it cannot adapt to the city's expansion due to the influence

of excessive motor vehicle development. As a result, an urban comprehensive transportation system with public transportation as the primary body and rail transportation as the leading mode of transport is required. The expansion of rail transit is a requirement for social and urban development. The growth of the urban population and the expansion of the urban scale necessitate the development of rail transit, a large-capacity mode of transportation, to meet people's traffic travel requirements; the development of rail transit can also counteract urban development., to further promote city development and guide the city toward large-scale, high population density, low energy consumption, and small land occupation. The relationship between economic development and urban transportation can be understood to be neither fully subordinate nor completely independent. Because the two interact and are interdependent, it is necessary to measure and develop the transportation industry while concentrating on economic development—not only should we rationally allocate transportation to develop economic undertakings, but we should also pay attention to the transportation industry while developing the economy. Develop and improve your skills.

4.1.2 Public transportation's impact on social and economic development

4.1.2.1. Public transportation has the potential to generate direct economic advantages.

Public transportation is under the tertiary industry group since it is a major production and value creation department in economic activities. The labor performed by public transit does not produce tangible goods, but it does directly meet people's needs by

providing services. Directly participate in the social and economic production process, create value by providing transportation products and services, and directly promote economic growth, whether it is passenger or freight transportation, directly realize profits through the transportation of people and goods, turn profits over to the country, and promote urban economic development, whether it is passenger or freight transportation, For instance, the degree of rental development in a city can be noticed to some extent.

4.1.2.2. The development of other sectors can be aided by public transportation.

For the development of other businesses, public transportation is a necessary economic activity. In order to jointly complete the supply activities of the products and services it supplies, the development of public transportation must be tightly interwoven with the development of other businesses. First, as a producer and consumer of commodities, the scope of activities and the size of activity capacity will directly affect the creation and consumption of wealth, thereby affecting the scale and rate of economic growth; second, as a producer and consumer of commodities, the scope of activities and the size of activity capacity will directly affect the value-added of capital and the speed of reproduction of goods; third, as a producer and consumer of commodities, the scope of activities and the size of activity capacity will directly affect the creation and consumption of wealth, As a result, the growth of the transportation industry, particularly public transportation, is critical to the growth of the economy.

4.1.2.3 Public transportation also has a detrimental impact on economic development .

While public transportation helps to foster economic development, it also has a negative impact on the economy. When the development of public transportation consumes a significant amount of economic resources such as land and energy, it inevitably results in a reduction in the occupation of resources by other economic activities, which has an impact on the economy's growth and creates new requirements for the development of public transportation. In general, urban transportation has a significant impact on the economic development of cities.

4.2 The reduction of public transport data during Covid-19

4.2.1 Status of public transportation during Covid-19

The outbreak of the New Crown epidemic coincided with the Chinese New Year, a period of huge movement of people, during which the number of passengers sent reached 2.98 billion. As of 24:00 on February 1, 2020, there were 14,380 confirmed cases, 19,544 suspected cases, 2,110 seriously ill patients, 304 deaths, and 328 cured cases nationwide.

As a result of the epidemic, China sent a total of 1.259 billion passengers by all types of transportation in the first 22 days of the Spring Festival (January 10-January 31, 2020), down 20.6% year-on-year in the lunar calendar (January 21-February 11, 2019, same below), broken down: the growth of passenger flow before the festival was

healthy, with a 2.0% year-on-year increase in passenger flow before the New Year's Eve. From the first day of the first month to the seventh day of the first month, passenger traffic is down 75.2% lunar year-on-year (January 25-31, 2020 compared to February 5-11, 2019), with the natural reason for the precipitous drop in data being the escalation of the epidemic and the government's decisive action.

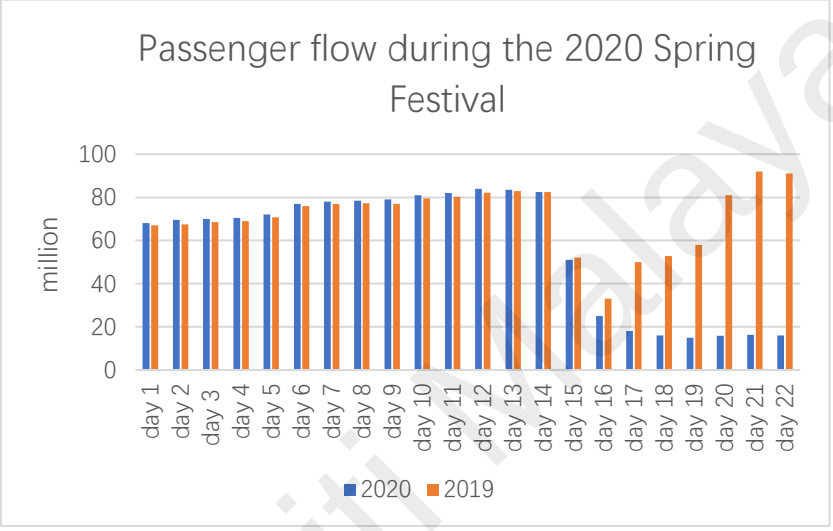

Figure 4.1 Passenger flow during the 2020 Spring Festival

In addition to the various local restrictions on travel measures, the national and local levels are taking various measures such as the complete suspension of travel agencies group tours, suspension of road passenger bus operations to limit the widespread flow of passengers, flight car cancellation is more common.

According to data from the Ministry of Transport: from the third to the fifteenth day of the first year of 2020, the total number of passengers sent nationwide was 166 million, only 16.5% of the same period last year (1,007 million)

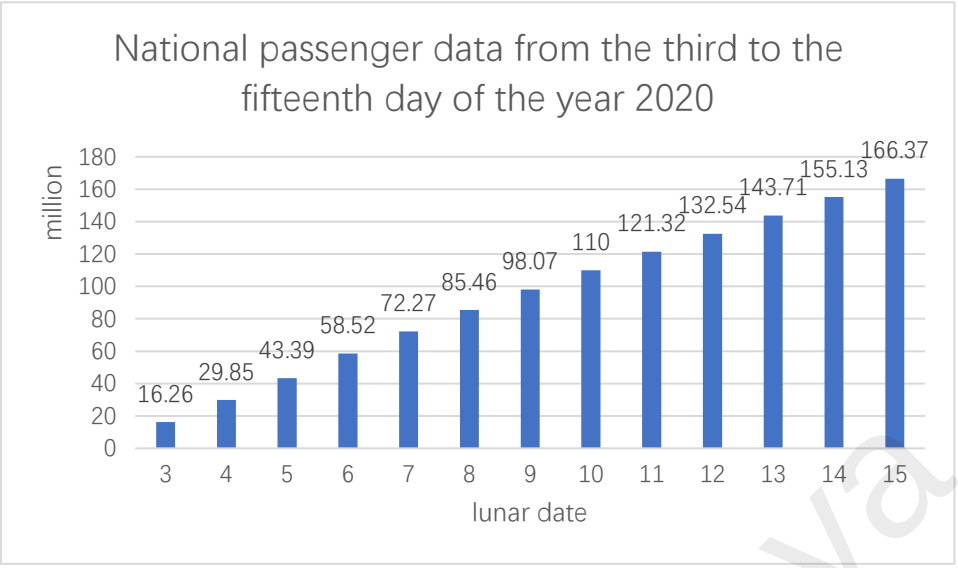

Figure 4.2 National passenger data from the third to the fifteenth day of the year 2020

From the return scale of the first-tier cities, the return scale of China's first-tier cities in 2020 is only 30.09% of the same period last year. Among them, the total return scale of North, Guangzhou and Shenzhen is 30.09% of the same period last year, specifically, Beijing is 30.33%, Shanghai is 34.63%, Guangzhou is 26.48%, Shenzhen is 29.52%.

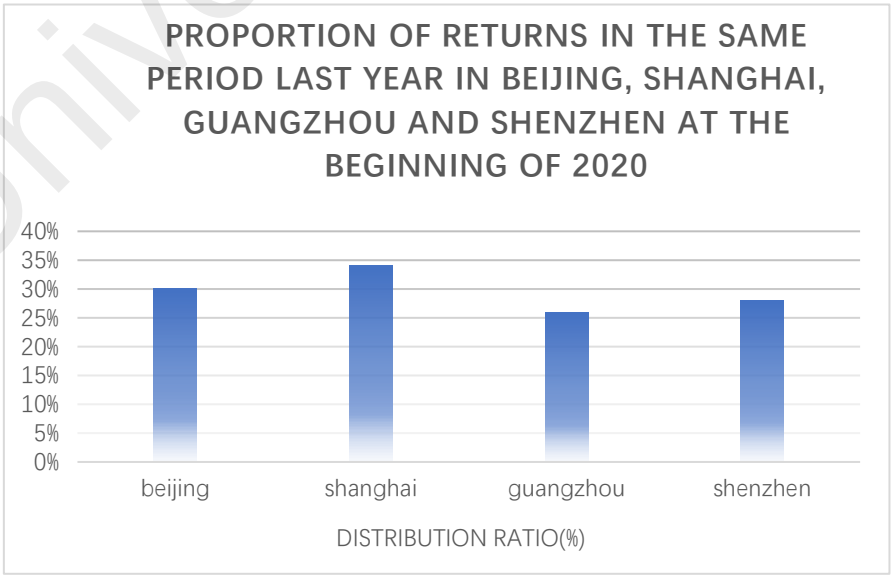

Figure 4.3 The return scale of the first-tier cities at the beginning of 2020

Civil aviation: the number of civil aviation passengers sent in the first 22 days of the Spring Festival was 33.89 million, with a cumulative year-on-year drop of 14.4%, including 28.05 million passengers before the festival, with a year-on-year increase of 6.7%, and 5.84 million passengers after the festival, with a year-on-year drop of 56.1%. Analysis from the flight volume of airports: the flight volume of airports in China's first-tier cities had a significant drop from January 23, 2020.

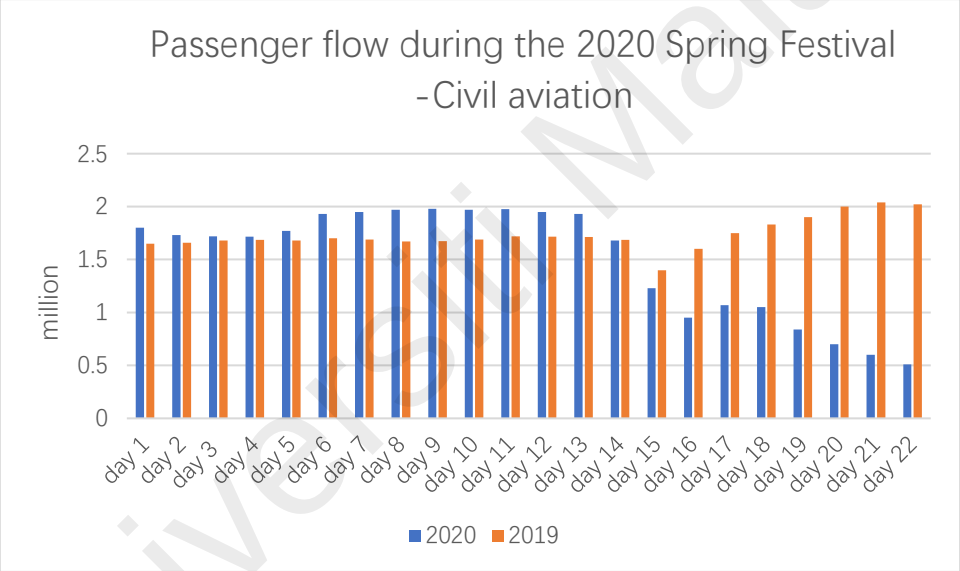

Figure 4.4 Passenger flow during the 2020 Spring Festival (Civil aviation)

Railway: The first 22 days of the Spring Festival saw 189 million railroad passengers sent, down 10.7% year-on-year, 168 million before the festival, up 17.2% year-on-year, and 20.37 million after the festival, down 69.9% year-on-year.

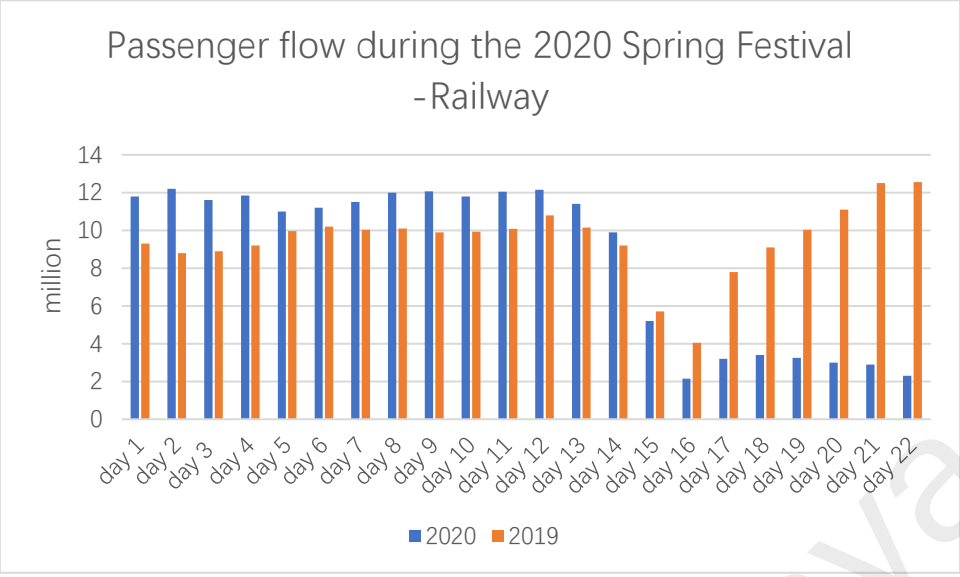

Figure 4.5 Passenger flow during the 2020 Spring Festival (Railway)

Highway: The number of road passengers sent in the first 22 days of the Spring Festival was 1.020 billion, down 22.0% year-on-year, the number of passengers sent before the festival was 933 million, down 0.6% year-on-year, and the number of passengers sent after the festival was 86.84 million, down 76.5% year-on-year.

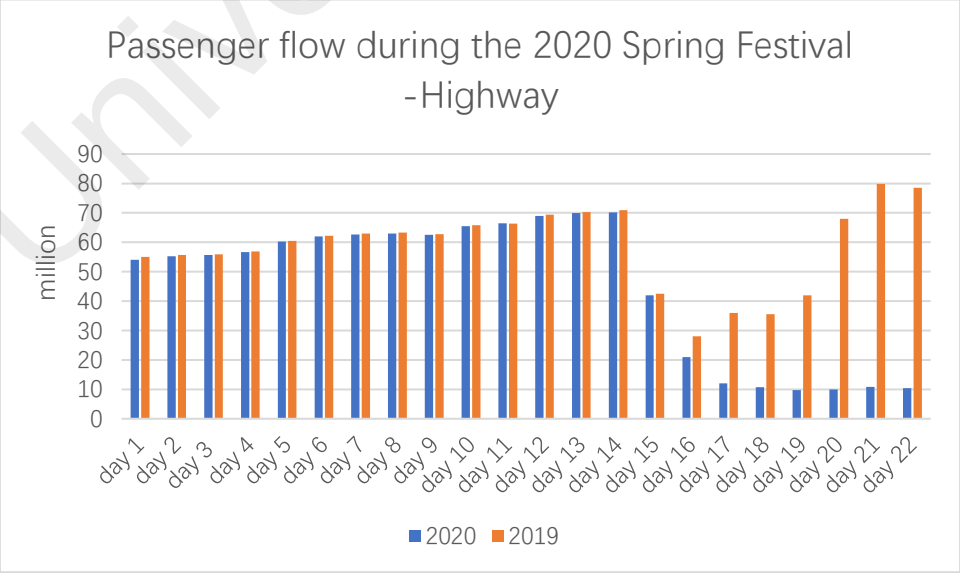

Figure 4.6 Passenger flow during the 2020 Spring Festival (Highway)

Water transportation: The number of passengers sent in the first 22 days of Spring Festival was 15.849 million, down 34.1% year-on-year, of which 13.98 million passengers were sent before the festival, up 4.6% year-on-year, and 1.864 million passengers were sent after the festival, down 82.5% year-on-year.

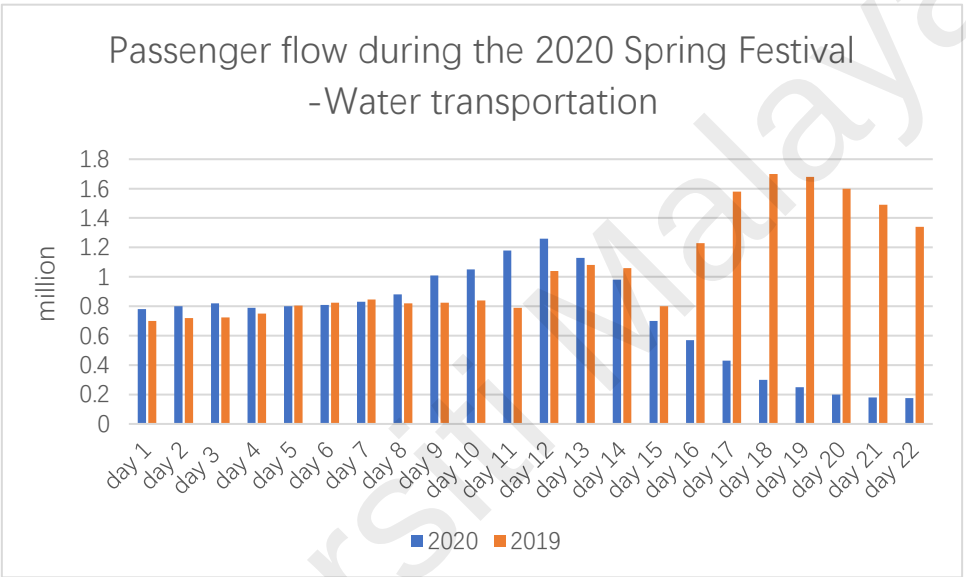

Figure 4.7 Passenger flow during the 2020 Spring Festival (Water transportation)

4.3 New guideline on public transportation safety during pandemic or any outbreak in future

4.3.1 Establish crisis awareness and strengthen detection and warning

Currently, due to the widespread belief that epidemics are no longer a major problem for human health or that it is only a problem for backward countries, epidemics are in

fact still one of the major threats to human health. In 2012, the Middle East Respiratory Syndrome coronavirus infected more than 100 people in South Korea and killed 15; in 2014, the Ebola virus diagnosed 13,676 cases and killed 4,910; and the new coronavirus pneumonia currently raging around the world, with more than 900,000 confirmed cases and 45,000 deaths as of March 28. Each pandemic outbreak is a major lesson learned.

According to the paper, "N95 respirators vs medical masks for preventing influenza among health care personnel: a randomized clinical trial," for patients with epidemic infections, saliva encased in the virus is followed by sneezing. Each sneeze emits more than 10,000 droplets up to 8 meters away, each emits 1,000-2,000 droplets up to 6 meters away, and even calm speech produces about 500 droplets per minute. This means that a single sneeze from a person with an epidemic infection on urban public transport could cause half of the passengers in a carriage to become close contacts.

Urban public transportation is a major catchment area for human traffic, bringing together a large number of people, and the relatively closed space increases the possibility of epidemic transmission. Prevention is the most important principle in emergency management of public health emergencies and is the key to prevent public health emergencies. The prediction and early warning mechanism is a very important link in the prevention and control of epidemic infectious diseases. It is important to improve the level of comprehensive and integrated detection and early warning, to

systematically analyze various potential factors and risks, to establish a proven early warning index system, to monitor the flow of people entering urban rail transit dynamically and in real time, and to activate early warning in time once abnormalities occur, so as to provide prevention and control of epidemic infectious diseases in urban rail transit.

Public transportation should actively explore the use of cloud computing, big data, Internet of Things, artificial intelligence, 5G, satellite communications, blockchain and other emerging information technology, urban public transportation infrastructure, electric power facilities, underground pipeline networks, housing buildings, etc., through a variety of technical identification, with smart chips, sensors, radio frequency identification, monitoring and sensing technology, to achieve object information collection, combined with the static data of urban infrastructure, intelligent algorithm analysis, effective wisdom, intelligent monitoring and early warning.

At present, China's public transportation has basically realized "face recognition" and "sweep code through the gate" and other intelligent riding experience, which not only improves the user's riding experience, but also has the ability of real-name tracking to a certain extent. In addition, affected by the new coronavirus infection epidemic, most public transportation has abandoned the traditional manual temperature measurement gun, instead using non-cooperative thermal imaging thermometer, passengers do not

need to stay, and do not need staff to perform the temperature measurement operation, passengers have entered the temperature measurement range when passing through the security check, the system has been the implementation of temperature measurement of people. Public transportation uses big data and artificial intelligence to establish the framework of epidemic monitoring and prevention and control system. In addition, the government and relevant departments should further increase the importance of public health epidemic prevention and control, build effective epidemic prediction and early warning, scientific and accurate tracking of epidemic prevention and control system, and further improve the efficiency of epidemic infectious disease emergency management and decision-making command.

4.2.2 Strengthen information communication, the implementation of joint prevention and control

4.2.2.1 Establish a diversified information sharing system

The fight against epidemic infections is a national participatory action. It is important to realize that from the perspective of prevention and control, an epidemic is an order, and information is what represents the epidemic. The epidemic epidemic interdiction battle is actually a battle of information, and the effective flow of information determines the speed and effectiveness of the battle. Therefore, the establishment of a unified command, division of labor, and resource sharing of urban public transportation joint defense and joint action is an important measure and means to deal with the

epidemic prevention and control.

Generally speaking, urban public transportation, public security, fire, medical, health, environmental protection, justice and other emergency departments have certain information resources and social resources respectively. They are only responsible for the work within the jurisdiction of their own departments and do not share information with each other, making communication and coordination of emergencies difficult and emergency linkage poor.

Therefore, it is necessary to establish a diversified information sharing system with the government as the center and the emergency departments such as urban transportation, public security, firefighting, medical, health, environmental protection and justice as the main line, supplemented by the subway, bus, railroad, aviation, power supply, communication, water, natural gas and other livelihood resources with equal cooperation and linkage, to improve the utilization of information resources and strengthen information communication in case of emergency, which can greatly reduce the inequality of information and Eliminate information distortion, help the most amount of information can be absorbed and utilized by all aspects of society, realize multi-layered information acquisition end, rapid transmission, accurate research and analysis, and ensure unified command, division of labor, and resource sharing in sudden emergency situations.

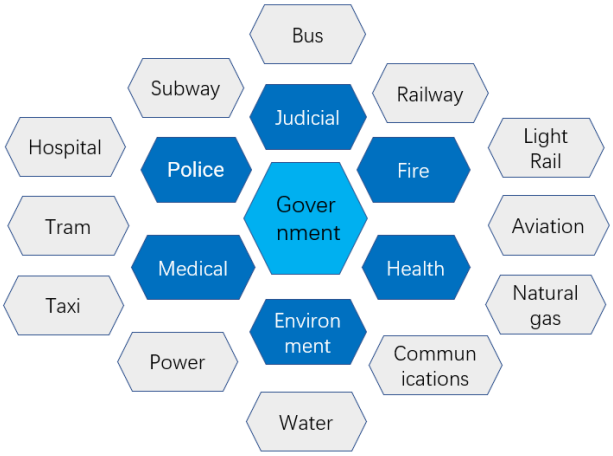

Figure 4.8 Diversified in formation sharing system

4.2.2.2 Establish a diversified group prevention and control mechanism

(1) Component urban public transportation enforcement team

In the case of epidemic outbreaks, there has been confusion between the authorities responsible for public safety in public transportation and the health department, and they have shifted their responsibilities to each other. Moreover, the law enforcement environment for police officers in public transportation is different from the norm, as police officers in stations and patrols may encounter "drunkenness", "verbal abuse of staff", "passengers not cooperating with temperature testing in stations", "passengers not wearing masks in stations", "passengers staying in stations and refusing to leave", and other behaviors that do not constitute violations of the law, which cause them to spend a lot of time and energy.

Each city government can introduce local traffic regulations and grant urban public transportation operators the right to enforce the law within a certain scope of authority, allowing urban public transportation operators to issue fines of a certain amount for some illegal acts during the operation process. Therefore, urban public transportation operators can set up full-time law enforcement teams according to actual needs, and after authorization by the Judicial Bureau, they can exercise law enforcement rights within a certain scope of responsibilities to assist in the safety management of urban public transportation operations.

(2) Recruiting Public Transportation Volunteers

Wherever they are, there are a group of selfless people who do not serve for money and fame, devote themselves to social public interest services, take the initiative to assume social responsibility and spread volunteerism.

Urban public transportation operators, on their own initiative, can form volunteer volunteer teams and use the power of volunteers to add to public transportation epidemic prevention and control to ensure people's safe travel. Taking Shenzhen, China, as an example, Shenzhen Metro Group has formed a volunteer association, and as of today, the number of volunteers exceeds 20,200, with 112 volunteer service stations, an average of 1006 volunteers arranged

daily, 340,000 service trips and more than 1 million volunteer hours provided in the year.

(3) Establishing a "social construction and governance" mechanism for public transportation

In order to cultivate passengers' safe riding habits, raise passengers' safety awareness, build a communication platform between public transportation departments and passengers, actively mobilize the general public to consciously participate in urban public transportation safety prevention and emergency disposal, strengthen joint prevention and control, enhance group efforts, and actively promote public transportation operation and management units to recruit "safety coordinators "On the one hand, it promotes the continuous improvement of all aspects of safety management, on the other hand, it accepts the supervision of the whole society with a modest and sincere attitude, further consolidates the mass and social foundation of urban public transportation, establishes a friendly and cooperative development relationship with all walks of life, maintains We will establish a friendly and cooperative development relationship with all sectors of the society, maintain the order of public transportation, guarantee the harmony and peace of public transportation, build a new mechanism of "social construction and governance", and create a new normal of urban public transportation safety prevention.

4.2.3 Classified and graded by district to protect travel services

As the development of the epidemic is gradual and information on newly crowned confirmed patients will be notified one after another in various places, and public transportation, as the main means of travel for people, needs to be forward-looking in the control of the epidemic, and relevant epidemic prevention and control measures should be formulated in a timely manner at the early stage of the epidemic to prevent and control the spread of the epidemic. According to different epidemic situations in different places, precise zoning classification and grading should be established, and operation strategies should be adjusted in a timely manner. Control measures should not be taken blindly, arbitrarily, rigidly or indiscriminately, not only to guarantee public transportation for urban operation and provide travel protection for passengers with rigid needs, but also to strictly control the spread of the epidemic and realize precise anti-epidemic and scientific epidemic prevention.

4.2.3.1 City risk classification

If there are no confirmed cases of novel coronavirus pneumonia or no new confirmed cases within 14 days, the area is defined as a low-risk area, and the main strategy of epidemic prevention and control is "external prevention and importation", and the area is fully transformed into a normal living and production state; if there are new confirmed cases of novel coronavirus pneumonia within 14 days, but the total number of cases is less than 50, or the total number of confirmed cases exceeds 50 but there is

no aggregation of epidemic within 14 days, the area is defined as a medium-risk area. If there are new confirmed cases of novel coronavirus pneumonia within 14 days, but the total number of cases is less than 50, or if there are more than 50 confirmed cases but there is no aggregated epidemic within 14 days, the area is defined as a medium-risk area, and the main strategy for epidemic prevention and control is "external prevention of importation and internal prevention of spread", steadily promoting the resumption of work and production, school and city, and gradually restoring normal life and production; if If there is an outbreak in the region within 14 days and the cumulative number of confirmed cases of novel coronavirus pneumonia exceeds 50, it is defined as a high-risk area and the main strategy for epidemic prevention and control is "external prevention of importation, internal prevention of proliferation, and strict control". According to the development of the epidemic, we should focus on the implementation of preventive and control measures, gradually promote the resumption of work and production, and carry out the resumption of school and city as appropriate.

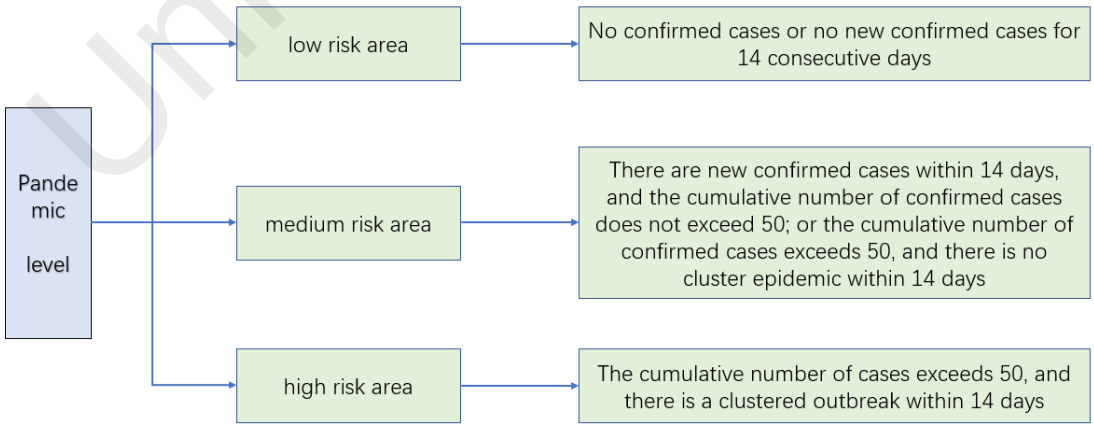

Figure 4.9 Classification of pandemic situation

4.2.3.2 Personnel risk level classification

In order to achieve better epidemic prevention and control, localities should combine the epidemic prevention and control situation with strict management and control of key populations and key sites. Epidemic prevention and control should adhere to scientific, targeted as well as precise. The scientific nature is reflected in the prevention and control according to the law and scientific prevention and control, the specificity is reflected in the classification guidance and zoning implementation, and the precision is reflected in the management and control of key populations and key places.

For the new coronavirus outbreak, residents can be classified into three levels of risk of outbreak transmission according to their recent travel and residence history, current physical health, and contact history with confirmed patients with novel coronavirus infection pneumonia.

(1) High-risk personnel

Risk personnel include the following six categories of personnel: medically confirmed patients, suspected patients, asymptomatic patients under medical isolation and observation, personnel in key and high-risk areas for epidemic prevention and control, close contacts under isolation (including centralized isolation and home isolation), and other personnel managing high-risk personnel. Strict control measures should be

implemented for high-risk personnel. At the request of the pneumonia epidemic prevention and control agency and the community, different measures should be taken for different high-risk persons, for example: persons from priority areas for epidemic prevention and control should be placed under intensive medical isolation and observation for N days (N is the incubation period of the epidemic) at their destination; confirmed and suspected patients should be treated in designated isolation treatment facilities with good isolation and protection facilities until they meet the conditions for discharge. Persons in high-risk areas are to be isolated autonomously for up to N days (N is the incubation period of the epidemic) in intensive or home quarantine; asymptomatic infected persons are to be placed under intensive quarantine observation for N days (N is the incubation period of the epidemic), during which the relevant institution will conduct sampling surveys at intervals of more than 1 day, and if the test results are negative in two consecutive specimens, the asymptomatic patient can be released from quarantine. Only close contacts can be isolated by situation, and centralized isolation should be used for medical observation if conditions permit, and conversely, home isolation can be implemented.

(2) Medium-risk persons

At-risk persons include the following five categories of persons: persons with symptoms of novel coronavirus pneumonia outbreak, persons in areas at moderate risk of the outbreak, patients who have been cured and discharged from the hospital after

less than 2 weeks of home isolation, asymptomatic patients who have been released from isolation after less than 2 weeks, and other persons who manage at-risk persons. At-risk persons must comply with community management and complete the standard requirements for home isolation. Different control measures will be applied to different intermediate risk persons, e.g., intermediate risk persons will be isolated at home for up to 2 weeks at their destination; confirmed patients who have been cured and discharged and asymptomatic patients who have been released from centralized isolation should also be isolated at home for up to N days (N is the incubation period of the outbreak) on their own.

(3) Low-risk personnel

Low-risk personnel are those who do not meet the characteristics of high-risk and low-risk personnel, and are located in areas with low risk of epidemic.

For low-risk personnel, the body temperature test is normal for travel and resumption of work.

4.2.3.3 Health Pass Card (Health Pass Code) Level Classification

The health pass card is based on real data, which is declared by citizens or people returning to work and work through the Internet, filling in information such as actual address, physical health status, whether they have been to the infected area, whether they have contact with key personnel, etc. After examination by the background, a QR

code belonging to the individual can be generated. The generation of the QR code is based on three main dimensions of assignment.

First, the spatial dimension, that is, according to the degree of risk of the national epidemic, in accordance with the data judged precisely to the township (street).

Second, the time dimension, i.e. the number of times a person has been to the infected area and the length of stay.

Third, the interpersonal dimension, i.e., the contact status with the key person, and then quantified and assigned a score. The data relies on data from the state and data aggregated from various departments and regions, and the risk status is measured after analysis and evaluation by prevention and control rules and data modeling [32] that is dynamically managed.

There are 3 colors of personnel health pass card.

(1) "Green code" personnel on behalf of the health registration platform has been self-declared, health registration records once or more, can be submitted to the health code production and issuance of audit, has been in the low-risk area personnel issued green health code. "Green code" personnel in public places to be released; encounter chokepoints or temperature measurement points on-site temperature measurement, will cooperate with the measurement of body temperature, no fever symptoms to give release, fever symptoms, according to the medical test results into the information, adjust the health code color, not released.

(2) "Yellow code" system audit comparison found that the applicant is recorded as a close contact, home isolation and has not yet reviewed the new crown pneumonia symptoms, or concentrated isolation is not full N days (N value for the incubation period of the epidemic); issued a yellow health code. Persons with "yellow code" will not be released and will be isolated centrally or at home, and will be required to report health information in the health registration system for N consecutive days (N is the incubation period of the epidemic). Those with no abnormal symptoms will be automatically upgraded to "Green Code". If there is any abnormality or not registered for N consecutive days (N is the incubation period of the epidemic), the "yellow code" will be invalidated to "red code".

(3) "Red Code" system audit and comparison found that the applicant is recorded as a confirmed (including clinical diagnosis), suspected, fever cases, the production and issuance of red health code. The "red code" personnel according to the epidemic prevention and control requirements in the designated hospital admission, isolation, immediately sent by the community to the designated hospital medical treatment or mandatory isolation.

4.2.3.4 Public Transportation Operation Strategy

(1) Level 1 epidemic prevention and control strategy, i.e., suspension of public

transportation operations.

During the outbreak of infectious diseases, according to the national laws on infectious diseases, the number of infectious people reaches a certain threshold and the city needs to be in full lockdown, urban transportation enterprises should strictly implement the primary epidemic prevention and control strategy and adopt the suspension of urban public transportation operations to cut off the transmission of epidemic infectious diseases.

Before the implementation of the primary epidemic prevention and control strategy needs to be converted to secondary or tertiary epidemic prevention and control strategy, urban public transportation should strictly implement to meet eight requirements.

First, urban public transport operators must be for the epidemic, the development of the epidemic during the resumption of work and production program, the establishment of a practical mechanism for the prevention and control of the epidemic.

Second, urban public transport operators must fully prepare the necessary materials and equipment for the prevention and control of the epidemic in transport premises and means of transport.

Third, in order to achieve equipment with good condition and stable operation, urban public transport operators must carry out timely and effective maintenance and repair of equipment.

Fourth, in terms of health management, urban public transport operators must

strengthen the transportation places and the public transport sanitary management, especially the disinfection and sterilization prevention work in public offices and places where people gather for operation.

five is that staff epidemic prevention and control investigation and information reporting must be implemented in accordance with the principles of dedicated personnel, accurate mapping, dynamic updating, establishment of a ledger, close tracking and scientific prevention and control.

Sixth, the epidemic prevention and control as well as emergency handling capabilities of front-line staff must be enhanced, and operational tutorials on disinfection of transportation tools and other aspects of epidemic prevention and control staff as well as training on related measures were conducted.

seven must be based on the special background of epidemic prevention and control, fully assess the security risks and weak links, and organize a major investigation and rectification of hidden dangers.

Eight is the implementation of real-name passenger registration, which can be used to scan the code for entering the station and the code for entering the seat, and to strengthen rail transit passenger health monitoring and information tracking by means of big data.

(2) secondary epidemic prevention and control strategy, that is, the implementation of urban rail transit waiting for the graded control, passenger separation strategy

This strategy is mainly used in the early stage of epidemic or transition period. In the early stage of epidemic, the etiological causes and transmission routes are unknown, so it is difficult for national disease prevention and control agencies and medical institutions to take targeted preventive and control measures, and it is difficult for clinical doctors to determine and formulate corresponding effective treatment plans.

During the transitional period of epidemic infection, although the pathogenic causes and transmission routes and other circumstances are clear, but limited by the city risk level, personnel risk level and health pass card (health pass code) level have not been established, urban rail transit enterprises should adjust the operating hours and extend the train interval according to the actual situation of epidemic prevention and control by publicizing externally, requiring passengers entering the station to wear masks throughout the journey, initiating temperature monitoring, encouraging Passengers should be encouraged to maintain spacing between trains, scientifically guide passengers to reduce crowd density, temporarily add "zipper" isolation films between cars, arrange corresponding guidance personnel on both sides of each platform, ensure that the maximum car occupancy rate is controlled at 30%-50%, and guide passengers to disperse into cars, disperse into seats, and separate into seats.

When the vehicle occupancy rate exceeds the standard, the escalator from the station hall to the platform will be shut down or run in reverse to reduce the rate of station hall

passengers entering the platform, and arrange staff to intercept at the platform as appropriate; when passengers start to pile up and crowd in the paid area of the station, close part of the ticketing system (ticket machines, entry gates, etc.) and arrange staff to intercept at the entry gates as appropriate; when passengers start to pile up and crowd in the non-paid area of the station, arrange staff to intercept at the exit gates as appropriate. When passengers start to pile up and crowd in the non-paying area of the station, staff will be arranged at the entrances and exits of the station to guide passengers to wait and board the train in batches, so as to achieve the purpose of crowd dispersion, no crowding on the platform and no undercrowding in the carriage.

(3) The third level of epidemic prevention and control strategy

Urban public transportation implements health code access and demand response strategy.

This strategy is mainly used in the period of epidemic tug-of-war or recession. With the mastery of pathogenic causes and transmission channels, the city risk level, personnel risk level and health pass card (health pass code) level gradually matured and improved, urban public transport enterprises should, according to the actual situation of epidemic prevention and control, require passengers entering the station to wear masks throughout the journey, activate body temperature monitoring, realize the health pass code access mechanism, and only allow passengers displaying Only passengers with green codes and normal body temperature monitoring are allowed to enter the station

and take the train. Make full use of station monitoring data, entry and exit gate records and other data, combined with historical passenger flow, to make timely demand response. Encourage passengers to maintain spacing when riding, scientifically guide passengers to reduce the density of crowd gathering, and implement hierarchical control at three key points: security check channels, gates and platforms, and equalize station fullness rate and train crowding to meet ≤50% in high-risk areas and ≤70% in medium-risk areas by shortening train intervals, adding temporary passenger trains, adjusting train stopping times, and changing train running crossings, so as to achieve crowdedness. The purpose of control is to disperse the flow of people, not to crowd the platforms and not to fill the cars.

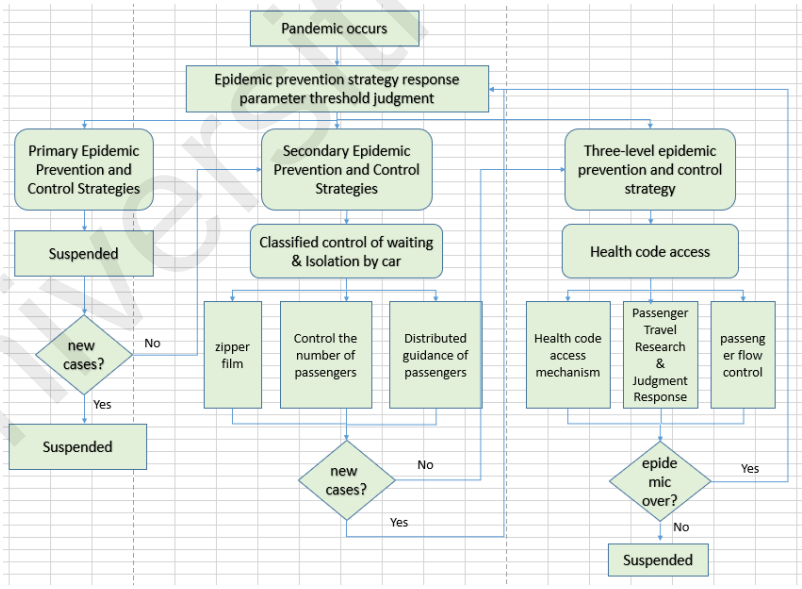

Figure 4.10 three level operation strategy of public transportation in response to epidemic situation

4.2.4 Scientific disinfection and ventilation, strengthen personnel protection education

Urban public transportation, as a crowded and frequently used transportation equipment, must take effective measures to prevent and control the spread of epidemic infections and prevent the risk of infection outbreaks, and must strictly follow the national ventilation and disinfection standards for regular ventilation and disinfection of transportation.

4.2.4.1 Personnel protection

(1) Reduce activities outside and try not to go to crowded public places, areas at medium risk of epidemic, or areas at high risk of epidemic; avoid prolonged stay in places with poor air mobility, such as cinemas, entertainment internet bars, public baths, closed shopping malls, etc.

(2) Wear a medical surgical mask or N95 mask when going out to public places or hospitals or taking public transportation for any reason.

(3) Avoid contact with public goods and facilities in crowded places. After coughing or sneezing, after returning from crowded places or public places, you should wash your hands with alcohol disinfection or hand sanitizer in time.

(4) Do personal and family health checks at home and take the initiative to measure body temperature when your body is abnormal. If you have small children at home, you should have your temperature measured regularly. If you find adverse symptoms, do

not take public transportation, avoid contact with the crowd, wear a mask and go to a medical institution in a timely manner to receive testing and treatment.

(5) Maintain good living habits and exercise. Be diligent in ventilation and cleaning; do not share personal belongings with family members and always ensure cleanliness and hygiene at home; disinfect and wash dishes and clothes regularly; take proper nutrition and avoid contact with and consumption of wild animals; always have a thermometer, protective masks, alcohol disinfection and other epidemic prevention supplies at home.

4.2.4.2 Publicity and Education

Urban public transport enterprises should make full use of television, radio, portals and other means to guide passengers to comply with rules and regulations, orderly travel, and work together to maintain good order of urban rail transit operations. Broadcast, posters or video and other ways to organize public health knowledge and science education, provide the general public with a supervisory telephone number, timely handling of the general public's feedback, and accept the community's supervision and inspection of the epidemic prevention and control. Encourage the public to actively participate in the prevention and control of the epidemic, strengthen cooperation in the prevention and control of the epidemic in rail transportation, identify problems and solve them in a timely manner, and gradually form a pattern of group prevention and control.

4.4 Discussion

People were unable to travel and consumption was nearly halted during the 10-day Spring Festival holiday in 2020 due to the onset of the Covid-19 epidemic. Experts estimate that direct losses in the retail, catering, and tourism industries alone totaled more than 1 trillion yuan. Production and business have been halted at the micro level, employees have been delayed in returning to work, and private businesses, small and medium-sized businesses, and employees have all been affected to varied degrees. Private businesses outperform state-owned businesses, small and medium-sized businesses outperform large businesses, and informal workers outperform formal workers in terms of impact.

The manufacturing industry will be impacted in the following ways: Delay the start of factories to avoid the pandemic from agglomerating, resulting in an insufficient number of workers returning. To prevent the virus from spreading between regions, traffic is regulated to some extent, resulting in constraints on raw material and commodity logistics, as well as challenges in obtaining raw materials. Manufacturing businesses must not only pay labor and other fixed costs, but also incur the risk of contract breach due to late delivery, putting them under a great deal of stress.

Transportation industry repercussions: In comparison to the previous year's Spring Festival travel, the overall number of travelers in 2020 has decreased dramatically. A total of 1.229 billion passengers were transported around the country by trains, roads, canals, and civil aviation on the 20th day before the Spring Festival travel (January 10-

29), which is greater than in 2019. In the same period in 2019, it was down 11.9 percent. In the first quarter, the number of tourists in the country as a whole will drop by more than 15%. It is predicted to result in a 4-5 percent drop over the course of the year.

It's especially crucial to secure people's community safety in public transportation in order to restore social stability and development. We should move forward in the direction of intelligence in the future in order to better solve this challenge, whether it is preventing infectious outbreaks or stopping their spread. Intelligent systems can be used to establish a varied information sharing platform, which can improve decision-making efficiency and information distribution. Simultaneously, the use of intelligent systems such as big data can give people with more precise and solid security assurances in terms of prevention.

CHAPTER 5: CONCLUSION

Public transportation, which plays an important role in socio-economic development, is particularly important to ensure people's normal travel and restore social order.

The following are the findings of this study:

(1) The impact of public transportation on social and economic growth is significant. It is vital to grow and strengthen the transportation business in order to restore and improve social and economic development in order to keep people safe in their communities when using public transportation.

(2) Covid-19's outbreak coincides with the Chinese Spring Festival. Passenger travel decreases as the New Year approaches. According to research, the number of tourists attending the Spring Festival in 2020 would be only 166 million, down 16.5 percent from the previous year. About 850 million people are affected in this period. COVID-19 saw a 75.2 percent year-on-year reduction in passenger traffic in the first seven days of 2020. Passenger traffic by civil aircraft, railway, road, and waterway declined by 56.1 percent, 69.9 percent, 76.5 percent, and 82.5 percent, respectively, over the next seven days.

(3) A new public transportation epidemic prevention system should be built based on national epidemic prevention measures and the current state of public transportation in response to public health epidemics. When it becomes evident that a public health epidemic is imminent, a sense of crisis must be developed, detection and early warning must be strengthened, information transmission must be strengthened, and a diverse group defensive group must be formed. A three-level epidemic prevention and control strategy guide will be produced on the basis of good publicity, guidance, and education, with clear divisions, classifications, and precise epidemic prevention to assure the safety of the masses.

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