Abstract Coronavirus disease 2019 (COVID-19) has become a global crisis. Sharing experiences in combating the COVID-19 pandemic and seeking international cooperation is an effective way to facilitate countries’ search for appropriate measures to prevent and control the pandemic. The new local confirmed case of COVID-19 suddenly appeared in Beijing on June 11, when there are 56 consecutive days with no new local cases but rapidly controlled in a short period. Its systematic strategy to combat the pandemic is worth sharing and learning from. Beijing’s pandemic prevention and control measures can be summarized in the “coordination, classification, and collaboration” approach. Based on this prevention and control strategy, Beijing’s anti-pandemic work coordinated the government, society, and individuals’ forces. It divided the critical works of pandemic prevention and control, coordinated the conflict between anti-pandemic work and production life, and finally achieved the smooth anti-pandemic work. Beijing’s experience in fighting the pandemic can provide one of the solutions to mitigate the global COVID-19 pandemic crisis.

Keywords Pandemic · Containment · Coordination · Classification · Collaboration · Resurgence
2.1 Introduction

Coronavirus disease 2019 (COVID-19) is a respiratory condition caused by a coronavirus and has been sweeping the world since December 2019 (Zhou et al. 2020). According to the data of Johns Hopkins University in the United States, as of 27 August 2020, the total number of confirmed COVID-19 cases worldwide had reached 24,203,815, with 826,380 deaths (Johns Hopkins University 2020). The pandemic has spread to almost every region of the world, and more than 200 countries, territories, and areas have reported confirmed COVID-19 cases. Despite varying degrees of global response and preparedness, the global pandemic is on the rise, with more than 200,000 new cases diagnosed every day, and the space for transmission is expanding. There is no doubt that the outbreak of the COVID-19 pandemic and its global spread has severely affected the public health and well-being (Yao et al. 2020), which is one of the United Nations Sustainable Development Goals (SDG).

Beijing, one of the world’s most populous cities, has experienced a renewed occurrence of COVID-19, even though the COVID-19 pandemic, which broke out in early 2020, was brought under control. However, within only 24 days since the first confirmed case appeared on June 11th, Beijing’s COVID-19 pandemic is rapidly brought under control. At present, the prevention and control of the pandemic in Beijing have entered normalcy; students at primary, secondary, and university levels are gradually returning to school, the economy has gradually been recovering, and social operation is on the right track. Behind the rapid control of the COVID-19 Pandemic in Beijing, the methods and experiences in combating the pandemic are worth sharing for global reference (Kokudo and Sugiyama 2020).

The pandemic occurred on 11 June 2020, when the first new confirmed cases being reported in Beijing after 56 consecutive days with no new local confirmed cases. Since the beginning, the cumulative confirmed COVID-19 cases are clustered in the Huaxiang area of Fengtai District, where the Xinfadi market is located, followed by a few cases in Daxing District, Dongcheng District, Xicheng District, and Chaoyang District. Most of those new confirmed cases were appeared between 14 and 21 June, with a steady decline from 28 June to 5 July. The Beijing municipal government, after the pandemic had been reported, immediately took strong preventive and control measures to quickly cut off the chain of transmission of the virus, effectively controlling the further spread of the pandemic in a short period. Although the COVID-19 epidemic from 11 June in Beijing showed a rapid expansion trend from the very beginning, the epidemic did not cause widespread spread thanks to the rapid emergency response and scientific prevention and control measures. After two stages of pandemics, Beijing’s experience in dealing with the COVID-19 pandemic has been further validated, based on lessons learned. The experience of COVID-19 prevention and control in Beijing can provide a model for China and the world in the fighting against COVID-19 Pandemic.

See: http://wjw.beijing.gov.cn/wjwh/ztzl/xxgzbld/gzbdyqtbd/202006/t20200612_1923481.html.
2.2 Response of Beijing to the COVID-19 Pandemic

2.2.1 Specific Prevention and Control Measures

After the reporting of new confirmed local cases in Beijing on 11 June, the government immediately organized professionals to conduct an epidemiological investigation and quickly pinpointed the Xinfadi Agricultural Products wholesale market as the source of the outbreak. The city and county Centers for Disease Control and Prevention organized professional staff to inspect the city’s wholesale produce markets and supermarkets on 12 and 13 June, and the Xinfadi market was closed that night to isolate the source of the virus quickly. At the same time, the government quarantined the people associated with the Xinfadi market and closed the community around the Xinfadi market. On 14 June, the government organized medical personnel to conduct nucleic acid tests for people associated with the Xinfadi Market and urged health insurance providers to strictly manage fever outpatient clinics, stressing the need to strengthen infection control in hospitals. In order to fully control the spread of COVID-19 pandemic, on 16 June, Beijing’s response level for public health emergencies was adjusted from Level 3 to Level 2, and 15 strengthened prevention and control measures were announced (Table 2.1).

Beijing government suspended university back-to-school and suspended primary and secondary school classes on 17 June to avoid infections in densely populated schools. A certificate of a negative nucleic acid test was notified as a mandatory requirement for personnel leaving Beijing from 18 June to stop the cross-regional transmission of COVID-19 caused by the movement of personnel. Nevertheless, 103,000 couriers had been tested for nucleic acids as of 20 June to control the spread of COVID-19 by service workers in close contact with the public, along with 1.18 million service workers was tested for nucleic acids as of 29 June. In order to ensure the coverage of nucleic acid testing and to screen potential cases where possible, the number of nucleic acid testing facilities was expanded to 124 as of 21 June. The price of a single nucleic acid test at a public nucleic acid testing facility was reduced from ¥180 to ¥120 on 25 June. In light of the pandemic that occurred on 11 June, the government has requested that the city’s high-quality medical resources be concentrated on treating patients and further strengthening the prevention and control of hospital-acquired infections. On 29 June, the government stressed that it would strengthen medical services during the normalization of pandemic prevention and control.

Furthermore, the government improved the prevention, control, and supervision of hospital-acquired infections to ensure the quality of medical services and medical safety. Under the unified deployment of the government, Beijing quickly responded

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2See: http://wjw.beijing.gov.cn/xwzx_20031/wnxw/202006/t20200613_192447-4.html.
3See: http://wjw.beijing.gov.cn/xwzx_20031/wnxw/202006/t20200615_1-924869.html.
4See: http://wj-w.beijing.gov.cn/xzwz_20031/wnxw/202006/t20200617_1926948.html.
5See: http://wjw.beijing.gov.cn/xwzx_20031/wnxw/202006/t20200629_1935075.html.
Table 2.1  Fifteen measures that must be strengthened under the second level of response

| Measure                                                                 | Measure                                                                 |
|------------------------------------------------------------------------|------------------------------------------------------------------------|
| 1. Strict control measures at farmers’ markets, food markets,         | 2. Strict inspection and quarantine of food at ports                     |
|   restaurants, establishments, cafeterias, etc                        |                                                                       |
| 3. Strictly control personnel leaving Beijing                           | 4. Restoration of closed community management                            |
| 5. Adjustment of public transportation ratios to control full load rates| 6. Implementation of comprehensive nucleic acid testing of personnel and close contacts in priority areas |
| 7. High school students stop returning to school, primary and           | 8. Body temperature monitoring must be done in public places and         |
|   secondary schools resume online instruction                          |   construction sites                                                    |
| 9. Indoor public places and parks and scenic areas are limited to      | 10. Enforcement of strict closed management of custodial, old age,      |
|   30% of the flow, and the flow is limited by appointment for a        |   welfare, mental health, and other special institutional premises     |
|   specific time period                                                 |                                                                       |
| 11. Strictly control the size of offline meetings and stop mass        | 12. Maintaining the outpatient appointment system                       |
|   gathering events                                                    |                                                                       |
| 13. Cease the opening of the domestic inter-provincial group travel    | 14. Wear a mask scientifically and carry a mask at all times             |
|   business                                                            |                                                                       |
| 15. Do not congregate if not necessary, and prevent people from       |                                                                       |
|   bunching up                                                          |                                                                       |

Source Xinhuang News (View details at http://www.bj.xinhuanet.com/2020-06/17/c_1126123440.htm)

with precise prevention and control. It took strong measures at the very initial stage of the outbreak so that the pandemic could be effectively controlled in a short period, and by 5 July, all the new local confirmed cases were cleared. On 20 July, Beijing’s emergency response level was resumed from Level 2 to Level 3.

2.2.2 Effectiveness of Preventive and Control Measures

Based on summing up the experience and lessons learned in the prevention and control of the pandemic since the second occurrence in Beijing, the relevant departments of the municipal government quickly deployed the correct pandemic prevention and control strategies. It responded to the outbreak in a timely and rapid manner (Table 2.2). The involvement of a series of precise prevention and control measures to efficiently control the further spread of the pandemic achieved remarkable success in pandemic prevention and control. The highest number of new confirmed cases was recorded on 13 and 14 June, after it had become clear on 12 June that the Xinfadi market was the source of infection and the relevant contacts were screened (Fig. 2.1). With the implementation of prevention and control measures, the number of newly diagnosed cases is on the decline. However, the number of new cases fluctuates, and
Table 2.2  Specific prevention and control measures of Beijing to the COVID-19 pandemic

| Date      | Prevention and control measures                                                                 | Source                                                                 |
|-----------|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| 12 June   | Identified the source of infection is Xinfadi market                                              | http://wjw.beijing.gov.cn/xwzx_20031/wnxw/20200613_192447-4.html       |
| 13 June   | Closed Xinfadi market                                                                          | http://wjw.beijing.gov.cn/xwzx_20031/wnxw/20200613_192447-4.html       |
| 14 June   | Nucleic acid testing for personnel involved in the Xinfadi market                               | http://wjw.beijing.gov.cn/xwzx_20031/wnxw/20200615_1-924869.html       |
| 16 June   | Response level adjusted from level 3 to level 2                                                  | http://wjw.beijing.gov.cn/xwzx_20031/wnxw/20200617_1926948.html        |
| 17 June   | School closed                                                                                  | http://www.xinhuanet.com/politics/2020-06/16/c_11261222450.htm         |
| 19 June   | Need a negative nucleic acid test to leave Beijing                                              | http://www.xinhuanet.com/bj/2020-07/20/c_1126260349.htm                |
| 20 June   | 103,000 couriers tested for nucleic acids                                                       | http://www.mot.gov.cn/jiaotongyaowen/202006/t20200622_3323204.html     |
| 21 June   | Nucleic acid testing institutions increased to 124                                               | http://wjw.beijing.gov.cn/xwzx_20031/wnxw/20200612_1929639.html        |
| 25 June   | Reduction in nucleic acid testing fees in public health facilities                              | http://www.xinhuanet.com/local/2020-06/28/c_1126168945.htm             |
| 29 June   | Nucleic acid testing of 1.18 million service personnel completed                               | http://www.xinhuanet.com/2020-06/30/c_1126175274.htm                   |
| 3 July    | 1,059,000 nucleic acid tests completed in the city                                               | http://www.xinhuanet.com/bj/2020-07/20/c_1126260349.htm                |

Source: Compiled by the authors

on 1 July, for the first time, the number of newly cured cases exceeded the number of newly diagnosed cases in a single day. On 6 July, the COVID-19 in Beijing was cleared of new local confirmed cases. On 8 July, the streets of Nanyuan, Nanyuan Township in Fengtai District, and Guanyinsi in Daxing District were adjusted from medium-risk to low-risk areas. As of 24:00 on 8 July, there was only one high-risk area and 15 intermediate-risk areas in Beijing, virtually eliminating the risk of continued illness in exposed individuals, and high-risk environments and populations have been effectively screened.

As of 20 July, the city had no new confirmed cases for 14 consecutive days, no community cases reported for 16 consecutive days, and all high-risk streets and villages were cleared. As of 6 August, all hospitalized cases of this period had been cleared, and the second occurrence of COVID-19 Pandemic in Beijing was now officially complete. Beijing had learned prevention and control measures of COVID-19 through its experience from the previous round of pandemic, which was effectively applied during the second occurrence. The city authority was able

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6http://www.gov.cn/xinwen/2020-07/20/content_5528408.htm.
7http://wjw.beijing.gov.cn/xwzx_20031/wnxw/202008/t20200807_1975976.html.
to control the pandemic within a short period through keeping it contained from spreading widely. Beijing’s experience in pandemic prevention is worth considering and learning. It could provide inspiration for countries around the world in dealing with the development of pandemics.

2.3 Lessons of the Prevention and Control of COVID-19 in Beijing

The pandemic prevention and control measures, taken by Beijing, effectively prevented the spread of the COVID-19 pandemic in the city and achieved rapid control of the pandemic. As the global COVID-19 pandemic continues to spread, the pandemic prevention and control measures and ideas were taken by Beijing can provide some reference for other countries to seek their own countermeasure strategies, and thus provide assistance to the global COVID-19 prevention and control.
2.3.1 Cooperation of Government, Society, and Individual

In the face of the resurgence of the COVID-19 pandemic, the concerted efforts of government, society, and individuals are key to bringing the pandemic under control (Johnson et al. 2020). The control of the resurgent of infectious diseases is based on identifying the source of infection. After a new case was diagnosed locally in Beijing on 11 June, the government quickly organized an epidemiological investigation and targeted the source of infection—Xinfadi Market—within 24 h. In the early morning of 13 June, the government issued an announcement that the Xinfadi market was temporarily closed, and 11 communities around the market were closed for management. After that, the government took a series of targeted measures to prevent and control the pandemic. Government departments play a key role in the development of prevention and control policies, the deployment of personnel, and the proper allocation of resources.

The media, businesses and social groups throughout society are responsible for publicizing, mobilizing, and implementing prevention and control measures in the course of pandemic prevention and control (Chan et al. 2020; Van Bavel et al. 2020). Since the occurring of the pandemic, the news media has conducted in-depth and timely interviews and reports on the process of fighting the Pandemic in Beijing. They reported the story of Beijing’s fight against the pandemic, disseminated knowledge of pandemic prevention and control, and responded to social and public concerns. Their work has further enhanced the understanding of the whole society about Beijing’s fight against the pandemic, as well as the international community’s understanding of China’s fight against the pandemic. Since the COVID-19 outbreak in the country, public interest from businesses and civil society groups has played a major role. Among them, donations from enterprises, material donations, airlines, and logistics companies to open a green channel for the transport of protective materials for the prevention and control of the pandemic has provided a huge boost. After the resurgence of the Pandemic in Beijing, in order to safeguard the basic needs of residents, wholesale markets, and supermarket chains have continued to supply daily necessities to residents based on strict pandemic prevention, providing a guarantee for social stability.

The active cooperation of the masses is the key to the implementation of pandemic prevention and control. After government departments and the media publicized the scientific prevention and control of COVID-19, the people consciously implemented their own individual prevention and control measures. These measures include home isolation, wearing masks, and attention to personal hygiene. In addition to their own protection, some of the caring people also actively donated money, assisted the hospital in publishing medical masks, protective clothing, and other medical supplies to help information, and provided free meals for medical workers. The active cooperation of patients is also incredibly important in the prevention and control of the pandemic. During the epidemiological investigation, the first confirmed case of the resurgent in Beijing was asked to recall all the places he had visited from 31 May to 10 June. Then, the 38 people he had come into close contact with all recalled,
providing essential information for the authorities to target the Xinfadi market and respond quickly.⁸

The combination of government, society, and individuals has formed a working pattern of coordination among all parties and participation by everyone, achieving smooth progress of pandemic prevention and control work from top-level design to policy implementation. The rational utilization of human resources has been maximized, and the rational and orderly work of pandemic prevention and control has been promoted, which has ultimately led to the rapid and effective control of the COVID-19 Pandemic in Beijing.

2.3.2 Coordination of Anti-pandemic Production and Living

Different with the pandemic firstly occurred during the Spring Festival, the resurgence of the pandemic in Beijing taken place after the full resumption of work and production in the city. Consequently, the pandemic prevention and control measures for the new disease clusters of COVID-19 faced a serious problem of coordination of anti-pandemic work, production, and life. In particular, as Beijing is the political and economic center of the country, the negative social impact of pandemic prevention and control was even more serious. So, the fight against the pandemic and the coordination of production and life deserves priority attention.

The pandemic prevention and control in Beijing have adoptd hierarchical management of each district according to the three levels of pandemic risk—high, medium, and low—and has adopted a limited closure strategy as far as possible in order to ensure the sustainable operation of the economy. The authorities began with a comprehensive screening, nucleic acid testing, and home observation of all persons in close contact and association with the Xinfadi market to minimize the negative impact of the pandemic. The second is the closure of some of the priority neighborhoods, with nucleic acid testing in priority areas and for priority groups. Unlike the Pandemic in Wuhan, the masses are also relatively free to leave Beijing for production and living needs. As of 18 June, people could leave Beijing with a seven-day “negative” nucleic acid test certificate, a policy that ensures the necessary population movement to the greatest extent possible.

In terms of life, after the closure of Xinfadi Agricultural Products Wholesale Market, a key hub for the supply of agricultural products in Beijing, the National Development and Reform Commission and the Ministry of Commerce urgently transferred vegetables into Beijing in order to stabilize prices in the vegetable market. In order to protect the basic needs of the public and ensure the health of those working in the service industry, on 20 June, Beijing conducted nucleic acid tests on 103,000 courier delivery personnel. By 29 June, Beijing completed 1.18 million nucleic acid tests for delivery and courier service personnel. On 5 July, the nucleic acid testing of more than 70,000 employees in the beauty and hairdressing industry was completed.

⁸See: http://wjw.beijing.gov.cn/wjwh/ztzl/xxgzbzl/gzbdyqtb/202006/t20200613_1924443.html.
Prioritizing nucleic acid testing for service industry workers will protect the livelihood needs of the public and prevent service workers from becoming super-spreaders if they contract the virus.

The pandemic prevention and control in Beijing has, on the basis of the experience gained from the previous round, coordinated as far as possible the impact of the anti-pandemic work on production and life. In turn, while maximizing the effectiveness of prevention and control measures, the basic needs of the masses for a living and livelihood have been safeguarded, which is of positive significance for social harmony and stability.

2.3.3 Combination of Coordination, Classification, and Collaboration

The COVID-19 outbreak prevention and control measures in Beijing can be summarized as a systematic approach of “coordination, classification and collaboration” (Fu et al. 2020). Of these, coordination, classification, and collaboration are interrelated (Zhao et al. 2020). The combination of the three promotes mutual cooperation among the government, society, and individuals, which is conducive to the mutual coordination of anti-pandemic work, production, and life.

The coordination is government-led. In the process of pandemic prevention and control, the roles played by the government, social organizations, and the masses are different. Therefore, based on clarifying the functions of district-level governments, social organizations, and the masses, the Beijing municipal government has coordinated the corresponding anti-pandemic work to ensure the reasonable allocation of anti-pandemic resources. The relevant state departments and the Beijing Municipal Government are the decision-makers. As decision-makers, they first quickly set the general level of prevention and control based on the development of the Pandemic in Beijing, in order to allocate human and material resources appropriately. Subsequently, relevant city and district government departments organized relevant professionals to conduct citywide surveys, actively test and track close contacts, and fully control fever clinics and nucleic acid testing sites in hospitals at all levels. By 20 June, the number of nucleic acid testing facilities had expanded to 124, and the maximum daily testing capacity had increased from 100,000 to more than 230,000.9 At the same time, the process of building the city’s nucleic acid testing capacity and the nucleic acid testing capacity of secondary general hospitals continues. In response to the problems in the prevention and control of hospital infections, city leaders first quickly interviewed the person in charge of relevant medical institutions. Strengthening the supervision and inspection of hospital infection prevention and control work, and strict implementation of medical staff, patients, and accompanying staff of the prevention and control requirements were ensured to maintain the capital’s pandemic prevention and control situation. In addition, the municipality

9Visit: http://wjw.beijing.gov.cn/xwzx_20031/wnxw/202006/t20200621_1929639.html.
strictly manages the number of visitors to Beijing from medium- and high-risk areas to reduce the risk of infection.

The classification work is the basis of the precise prevention and control, limited closure strategy adopted by Beijing. After the resurgent in Beijing, the area of the resurgent was quickly identified and communities and streets were classified according to the severity of the spread of the disease. From 11 June to 1 July, a total of 11 districts and 47 neighborhoods in Beijing found confirmed cases of COVID-19, with the highest peaks in the streets of Huaxiang and Xincun in Fengtai District, Xihongmen Town and Huangcun Town in Daxing District, and Yongding Road in Haidian District. There are five high-risk areas in the street and 39 medium-risk areas in the Xicheng district, including Yuetan Street. Beijing has adopted strict control measures for communities and villages under the jurisdiction of medium- and high-risk cities and towns (Fig. 2.2). Conducting large-scale nucleic acid tests on key populations, key regions, and key areas, such as high-risk individuals in Xinfadi market and surrounding communities, residents of medium- and high-risk streets and villages, and employees in services such as catering, supermarkets, wholesale markets for agricultural products, logistics, and takeaway services.

The orderly collaboration of the government, social organizations, and individuals is a necessary condition for the implementation of Beijing’s pandemic prevention

Fig. 2.2  Distribution of risk levels in key areas of Beijing (as of 17:00 on 26 June)
and control policies. In pandemic prevention and control, the government is mainly responsible for overall planning and decision-making; individuals mostly carry out pandemic prevention and control work on their own initiative, and social organizations can participate in pandemic prevention and control in a relatively orderly manner. After the second Pandemic in Beijing, the government quickly mobilized social forces to participate in the prevention and control of the pandemic. Social organizations, on the other hand, are actively involved in the prevention and control of the pandemic on the basis of conducting their own personnel checks. For example, they were assisting community workers with outreach and surveys, delivering household items to people in home isolation, and providing psychosocial support services. The general public, on the other hand, consciously fulfilled their responsibilities, reduced travel, protected themselves, and actively cooperated in the prevention and control of the pandemic. Many people joined the volunteer ranks and did their best to assist in the control of the pandemic. In addition, many cured patients actively donated plasma for clinical treatment. The whole community actively participated and contributed to the victory of this “people’s war.”

Based on the integration of coordinated, classified, and collaborative responses, Beijing has formed a systemic pandemic prevention and control system. Beijing will focus on solidifying a series of proven institutional measures that have been explored and developed in Beijing’s pandemic prevention and control practices, in response to the problems and shortcomings that have been exposed in pandemic prevention and control. In addition, the Beijing Regulations on Emergency Response to Public Health Emergencies is in the process of being formulated, and this upcoming local regulation will provide solid legal safeguards for responding to public health emergencies in the capital.

2.4 Suggestions

Under the systematic anti-pandemic work of Beijing, the COVID-19 Pandemic from 11 June in Beijing was quickly brought under control. In the face of the global COVID-19 crisis, each country needs to explore its own countermeasures on a widely shared basis. The experience gained in Beijing can provide some references for the global fight against the pandemic. Here we highlight five measures that countries can take for reference (Fig. 2.3).

2.4.1 Strengthening the Coordinate Capacity of Government

Government coordination is an effective means of rationally allocating resources for combating epidemics. The basis of government coordination is a sound management system. So it is necessary to focus on strengthening the public health emergency
management system, coordinating the roles of the government, society, and individuals in the prevention and control of epidemics, and strengthening the ability to deal with public health emergencies, especially epidemics of infectious diseases. Attempts can be made to formulate regulations on emergency management of public health events to clarify the powers and responsibilities of the government in the event of a pandemic of a public health emergency and to clarify the basic procedures for handling public health emergencies.
2.4.2 Identifying Priorities for COVID-19 Pandemic Prevention and Control

A clear focus on pandemic prevention and control is the basis for classification and collaboration. The focus of epidemic prevention and control is not limited to identifying key regions and key populations but also includes identifying key environmental factors for epidemic development and key nodes for epidemic prevention and control. In the face of a sudden epidemic outbreak, we can first try to identify the source of the outbreak, after which we need to strengthen the epidemiological investigation, screen, and control the flow of close contacts while identifying the source of infection of the epidemic. It will be followed by the implementation of the responsibilities of the territory, departments, units, and individuals after identifying the key areas and key nodes for epidemic prevention and control according to the environmental conditions and the development of the epidemic.

2.4.3 Ensuring the Essential Production and Livelihood

Epidemic control inevitably affects the movement of factors of production, the mobility of people, and the supply of subsistence goods. Prolonged and irrational epidemic prevention and control measures may cause economic stagnation, shortages of subsistence goods, and other problems. Therefore, epidemic prevention and control need to consider the principle of safeguarding production and life. With the trend toward normalization of epidemic prevention and control, prevention and control measures need to take greater account of the impact on production and life in order to ensure normalization of production and life.

2.4.4 Strengthening COVID-19 Dynamic Monitoring

COVID-19 cannot be eradicated in the short term, so the world will continue to be threatened by COVID-19 for some time. Although some countries, including China, have achieved better performances in combating COVID-19, the threat of COVID-19 still exists. Therefore, dynamic surveillance of COVID-19 needs to be strengthened regardless of the effectiveness of national outbreak control. This dynamic monitoring is, on the one hand, an overall assessment of localized COVID-19 outbreaks and, on the other hand, a risk assessment of COVID-19 outbreaks based on population movements and environmental factors, with regular sampling of high-risk areas.
2.4.5 Conducting COVID-19 Pandemic Prevention and Control Awareness Campaigns

The masses are the backbone of epidemic prevention and control, and epidemic prevention and control requires everyone in society to protect themselves and hopes that more people will participate in epidemic prevention and control. On the one hand, the dissemination of knowledge on epidemic prevention and control can lead the public to adopt healthy behaviors and actively take personal precautions. On the other hand, it can enhance the acceptance of epidemic prevention and control measures, which is conducive to mobilizing social forces to participate in epidemic prevention and control.

At present, the COVID-19 pandemic has become a global crisis, and the search for reasonable prevention and control measures is a challenge to control the further spread of the COVID-19 pandemic. The success of COVID-19 pandemic prevention and control in Beijing proves that systematic prevention and control measures can be effective in stopping the spread of COVID-19. Therefore, all countries can learn from each other’s experience in fighting pandemics and cooperate with each other. This is the way to overcome the pandemic and ensure the sustainable development of human society.

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References

Chan A, Nickson CP, Rudolph JW, Lee A, Joynt GM (2020) Social media for rapid knowledge dissemination: early experience from the COVID-19 pandemic. Anaesthesia 75(12):1579–1582
Fu BJ, Zhang JZ, Wang S, Zhao WW (2020) Classification–coordination–collaboration: a systems approach for advancing sustainable development goals. Natl Sci Rev 2020(5):5
Johnson T, Dawes C, Fowler J, Smirnov O (2020) Slowing COVID-19 transmission as a social dilemma: Lessons for government officials from interdisciplinary research on cooperation. J Behav Public Adm 3
Kokudo N, Sugiyama H (2020) Call for international cooperation and collaboration to effectively tackle the COVID-19 pandemic. Glob Health Med 2:60–62
University JH (2020) COVID-19 dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU). https://coronavirus.jhu.edu/map.html. Accessed 27 Aug
Van Bavel JJ, Baicker K, Boggio PS, Capraro V, Cichocka A, Cikara M, et al. 2020. Using social and behavioural science to support COVID-19 pandemic response. Nat Human Behav 4:460–471
Yao H, Zuo X, Zuo D, Lin H, Huang X, Zang C (2020) Study on soybean potential productivity and food security in China under the influence of COVID-19 outbreak. Geogr Sustain 1(2):163–171
Zhao W, Zhang J, Meadows ME, Liu Y, Hua T, Fu B. (2020) A systematic approach is needed to contain COVID-19 globally. Sci Bull 65(11):876–878
Zhou C, Su F, Pei T, Zhang A, Du Y, Luo B, Cao Z, Wang J, Yuan W, Zhu Y (2020) COVID-19: challenges to GIS with big data. Geogr Sustain 1(1):77–87

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