Commentary

# Strengthening Community Defenses to Prevent and Control the Spread of COVID-19 in China

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## ABSTRACT

In light of the severity of coronavirus disease (COVID-19) around the world, it is an arduous task for China to prevent COVID-19 from being imported from abroad and proliferating domestically. The community is the first and most effective line of defense and can effectively cut off the channels of spread of the epidemic. In order to reduce risks of COVID-19 transmission in the community, it is necessary to sort out the loopholes in risk and management, as well as investigate previous epidemic transmission events in the community.

In the first week of 2022, more than 15 million new cases of coronavirus disease (COVID-19) were reported to the World Health Organization (WHO) from around the world (*1*). From December 2021 to January 2022, clusters of cases were reported in Shanxi, Henan, Tianjin, and Beijing. Currently, China's epidemic prevention focuses on people from overseas and domestic high-risk areas, as well as imports of cold-chain items. While vaccines remain highly effective at preventing severe disease and death (*2*–*3*), they do not fully prevent transmission (*4*). After the community finds a positive infected person, it is important to determine the close contacts and sub-close contacts as soon as possible and transfer them as soon as possible. Consolidating the defense line of the community prevention relies on a series of rapid, scientific, and precise prevention and control measures. As such, we made a series of these recommendations.

## RISKS DURING NORMAL EPIDEMIC CONDITIONS

With the increase of e-commerce, more people buy foods that need cold chain transportation from overseas online shopping platforms. The epidemic situation abroad is serious, and it is difficult to avoid carrying the virus in the outer package of express delivery or even cold chain food (*5*). People working in the cold chain or receiving deliveries are at risk of infection. A previous study suggested that poor ventilation and insufficient hygiene facilities may increase the risks of infectious disease outbreaks (*6*). Supermarkets, shopping malls, restaurants, and other public places have a large flow of people, but code scanning and body temperature measurement under normal epidemic prevention and control conditions are not carefully implemented. During holidays, weddings, or funerals, it is traditional for Chinese families and friends to have dinner together, especially in rural areas. Once there is a source of infection, the epidemic will likely spread rapidly.

If community workers cannot conduct contact tracing accurately at the time of the outbreak, it is difficult to implement large-scale nucleic acid screening sampling without missing anyone. In addition, if close contacts failed to be transferred to quarantine as fast as possible, there would be risks of social transmission.

## RISKS IN AN OUTBREAK

The complex rental housing structure along with an unclear number of tenants made nucleic acid screening and sampling difficult without missing someone. For example, if someone quarantined at home was not sampled for several days or large communities being unable to test all residents in one day, etc. In addition, some individual nucleic acid sampling methods were not standardized or reasonably laid out. Disinfection and medical evaluations were not performed in a timely manner after the confirmed COVID-19 patients were transferred, and most communities had incomplete preventive disinfection records. In some communities, medical waste and domestic waste were improperly mixed together.

In some areas, the health monitoring records were lacking or incomplete. Special groups such as the elderly and pregnant women in some communities had

difficulties seeking medical treatment and purchasing medicine. In some control areas, low-income residents did not have basic living conditions and supplies guaranteed.

During the epidemic, basic medical care and other public health services could not be delivered in a timely and effective manner. There was no professional team for disinfection and effect evaluation. Urban villages have high house density, poor sanitary conditions, and arbitrarily modified sewage pipes and toilets — which do not meet the sanitation requirements. The complex composition of public health personnel further complicated the management of epidemic prevention. Close contacts of COVID-19 cases could not be accurately identified in some containment areas. Some groups in the containment area did not have independent bathrooms or kitchens, so it was difficult to truly isolate at home and there was a risk of cross-infection.

Larger-scale residential areas in cities have high population density, and the number of residents is not always clear. Elevator cars and buttons, stair handrails, unit door handles, and other high-frequency use and closed environment of public facilities were likely to cause virus transmission (*7*–*8*). It was difficult to control the flow of people in and out of commercial and residential buildings that faced the street. Some people stranded in the office areas stored food in advance and hid inside, unwilling to come out for nucleic acid testing. Stranded workers at construction sites with poor environmental conditions risked being part of a cluster infection of COVID-19 cases.

## PREVENTION AND CONTROL MEASURES DURING NORMAL EPIDEMIC CONDITIONS

Regular nucleic acid testing should be carried out for cold-chain food and goods moving through airports, ports, transportation, storage, markets, and retail stores. We need to fully test, sterilize and trace the imported cargo and cold chain food. Also, personal protection and health management of key personnel must be strengthened. Daily random inspections of cold-chain food entering the customs at the port and in the market is recommended. Wholesale markets selling frozen, chilled, and fresh products should be operated in well-ventilated places, and the frequency of routine disinfection practices should be increased. Customers must validate their health code and get their temperature taken before entering. Wholesale and retail outlets should shift toward online shopping, contactless delivery, pickup, etc. Gatherings such as weddings and funerals need to be simple, with people wearing surgical masks and adhering to hand hygiene and social distance to avoid potential infection. Community (village) grid members should stay informed of the actual situation of COVID-19 infections within their village. Pharmacies are prohibited from selling medicines for symptoms related to COVID-19, and if someone bought one of these drugs, the health code would pop up, indicating that a nucleic acid test is needed as soon as possible.

## PREVENTION AND CONTROL MEASURES IN CASE OF OUTBREAK

Community epidemic prevention and control needs to be carried out in three aspects: "containment, screening, and isolation." Epidemiological investigations should be sped up and data should be immediately shared to identify the close contacts of COVID-19 cases and transfer those patients to centralized quarantined sites as soon as possible. In the containment area, sampling should be carried out directly at households to ensure that no one is missing. Nucleic acid sampling locations should be standardized: rational layout, single entry and single exit, with spacing greater than two meters between sampling stations. It is necessary to strengthen the training of nucleic acid sampling personnel, guarantee their protection and hand disinfection, increase sampling personnel and supplies, add sampling locations, transfer samples in accordance to the standard protocol, and release the test results as soon as possible. Health monitoring is carried out for all personnel every day in the containment and controlled areas.

After a confirmed COVID-19 case is transferred, a professional disinfection institution must be arranged to carry out terminal disinfection in accordance with "COVID-19 Prevention and Control Plan (Eighth Edition)." At the same time, the disease control institution should coordinate the processing and disinfection. In communities or villages where confirmed COVID-19 cases are found, disinfectants should be added to the septic tank and, only after passing a test, can the sewage be discharged into municipal pipelines. Fixed temporary storage points for medical waste should be set up and the frequency of

disinfection should be increased so as to achieve "double bags, double seals, and double elimination." A roster of special personnel and a health service mechanism should be established to deal with this medical waste. The community should announce the channels for medical treatment to the public, including helping coordinate vehicles and contact medical institutions to ensure patients seek medical treatment in a timely fashion. A guarantee mechanism for the supply of basic living supplies should be established and distributed.

Improving the primary healthcare system and building healthcare capacity requires giving primary health institutions important roles in epidemic prevention and control. The district (county) CDC should set up a disinfection department to guide third-party disinfection institutions together with the health supervision center to carry out and evaluate the disinfection process and quality.

It is necessary to strengthen the supervision of housing construction in villages to avoid "illegal construction", especially the random modification of sanitary pipes. Through carrying out "knock-on" actions, the number of personnel was identified, and the personnel roster was established. The flow of people during the epidemic should be controlled, and those who do not have quarantined conditions at home need to be transferred to a centralized quarantined site. The roster of personnel in residential buildings should be established. Attention should be paid to the management and control of stranded people in commercial shops and construction projects. We should increase the number of inspections of commercial and residential buildings to keep track of the number of stranded personnel.

In order to adhere to precise scientific requirements, it is necessary to implement prevention and control measures with high standards and further reduce the risk of epidemic transmission in the community; control measures can be upgraded if necessary. The following conditions should be considered for expanding the scope of the containment and controlled areas: 1) the transmission chain is unclear and the source of infection is unknown; 2) infected persons have complex movement trajectories, and they have contact with other people at workplaces, activities, residences, etc., resulting in a high possibility of transmission; 3) there are multiple infected persons in different buildings in the community or residence community; 4) infection occurs among the staff involved in prevention and control in the community or residence community; 5) when the infected person or the close contact person is transported, the closed loop and protective measures are not strictly taken, which may increase the risk of transmission in the community; and 6) other situations that may cause the spillover of the epidemic in the community.

Scenarios to consider escalating controls: 1) it is difficult to track and determine close and sub-close contacts; 2) the close contacts and sub-close contacts quarantined at home and have not been transferred to the isolation point; 3) the communities have not taken sufficient technical defense for those quarantining at home to prevent them from going out; 4) there are phenomena such as irregular crowd protections, gatherings, frequent access to buildings (residences), etc.; 5) urban-rural junctions or rural areas with insufficient sanitary conditions, difficult management, and high risk of transmission; and 6) other situations that may cause the spread of the epidemic in the community.

In conclusion, a zero-COVID strategy is the current policy for the prevention and control of the epidemic in China (*9*). When local COVID-19 cases appear, comprehensive actions should be taken immediately to ensure timely detection, rapid disposal, precise control of spread, and effective treatment. Guiding the community to carry out epidemic management in a scientific and orderly manner can successfully curb the spread of COVID-19 in the community — one of the most effective ways to minimize the harm caused by the epidemic to people's health and livelihood.

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