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Title Page:

Community-based Prevention and Control of COVID-19: Experience from China

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Since the outbreak of an unknown contagious pneumonia in December 2019, China has gained global attention. This highly contagious disease, COVID-19, was confirmed to be caused by a novel type of coronavirus, SARS-CoV-2. A recent preprint article with 8866 cases reported the overall case fatality rate (CFR) and the basic reproduction number ( $R_0$ ) to be 3.06% (95%CI 2.02-4.59) and 3.77 (95%CI 3.51-4.05), respectively[1]. It is urgent to cut transmission pathways and protect populations at risk.

This raised great challenge for a country with such a large population and mobility at this timepoint of Spring Festival travel season. Here, we introduce some experience of community-based prevention and control from mainland China.

### **1. Population mobility control**

#### 1.1 Access control

Residential communities, both in urban and rural areas, set restrictions on access. Since February, many cities, including Nanjing, Hangzhou, Chengdu, Harbin etc., have limited the number of people going out per household, with only one person permitted for purchasing necessities every one to three days. Temperature is checked at each entrance. Visiting activities from outside are prohibited.

#### 1.2 Transportation control

Some local governments have set restrictions on transportation. Cars are permitted to go out according to the tail numbers every day. Entrance of cars from other regions are strictly limited, and even forbidden in some communities.

#### 1.3 Gathering control

Public places most likely to have gatherings are shut down, including cinemas, mahjong clubs, amusement parks etc. Restaurants are not encouraged to run offline business. Gatherings of any kind are banned.

## 2. Digital management

### 2.1 Community grid management

The grids are built up based on community blocks. Each grid has working staffs consisting of administrative staffs, residential committee staffs, police officers, volunteers etc. They collect basic information of every resident in a 'door-to-door' way, including where they have been to in the last 14 days, contact history with patients, daily symptoms (fever, cough, diarrhea etc.), troubles, and provide certain services. Most of the work can be achieved by phone calls, video calls, instant messages and applications based on Internet Plus techniques. Even artificial intelligence technologies (AIT) are used to identify people not wearing masks outside. These real-time information are shared in the cloud platform for big data analysis, which helps identify suspicious patients and facilitates government making decisions.

### 2.2 News media

While television and broadcast remain the traditional ways, news coverage through Internet plays greater roles. Websites, blogs, and social media applications can present real-time information of what is happening and what is needed in the community. Innovative disseminations, like unmanned aerial vehicles (UAV) broadcasting notices and applications showing instant location of newly diagnosed patient, are also developed.

### 2.3 Communication

The most efficient communication tool is social contact application. Working staffs of the community can create Wechat chatting groups for different purposes and post notices so that everyone in the community can reach them in the first place. Besides, some mini programmes and official accounts in the software provide functions of questionnaire and table editing, so that information of the health

conditions can be collected in a very short time.

### 3. Disinfection

Disinfectants are sprayed at every building, road and street every day. Residents are informed and educated to mind hand hygiene and household cleanliness.

### 4. Supply

The government makes sure that sufficient supply is available. Residents can buy necessities and order meals through online take-away applications. The goods are delivered in non-contact way. Some even use UAV to deliver.

Protection of healthy ones and screening of suspicious ones are as important as curing one. Clustering at home and in public spaces contributes to its wide spread. Therefore, the community should be the first-line fortress, and more resources are needed to support it.

As the virus is indicated to have inter-person transmission[2], the main task is to control the population flow. While the  $R_0$  value is estimated to be a bit lower than SARS and that it might decrease with more strong measurements taken[3,4], the actual weight of community needs to be clarified in future models. But nobody should underestimate its power. The trends of increasing time for doubling incidence outside Hubei province indicate that these measurements might be effective[5].

Although these rigorous stay-at-home measurements bring much inconvenience and cause certain loss, it is worthwhile for the wellbeing of all humankind. However, several issues still need to be addressed in future practices, including the privacy of citizens, protection of the suspicious and others concerning laws and ethics. As people are gradually returning to work, the situation might be more complex. Community prevention and control will meet greater challenge at that time.

**Declaration of interests:** All the authors declare no conflict of interests.

## References

1. Yang Y, Lu Q, Liu M, et al. Epidemiological and clinical features of the 2019 novel coronavirus outbreak in China. *medRxiv* 2020: 2020.02.10.20021675.
2. Chan JF, Yuan S, Kok KH, et al. A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: a study of a family cluster. *Lancet* 2020.
3. Wu JT, Leung K, Leung GM. Nowcasting and forecasting the potential domestic and international spread of the 2019-nCoV outbreak originating in Wuhan, China: a modelling study. *Lancet* 2020.
4. Chen J. Pathogenicity and Transmissibility of 2019-nCoV-A Quick Overview and Comparison with Other Emerging Viruses. *Microbes Infect* 2020.
5. Muniz-Rodriguez K, Chowell G, Cheung C-H, et al. Epidemic doubling time of the 2019 novel coronavirus outbreak by province in mainland China. *medRxiv* 2020: 2020.02.05.20020750.