

Strategies for preventing COVID-19 spread in communities

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I. Basic concepts of preventing contagion

SARS-CoV2 can be spread via droplets and through contact since the virus can live up to several hours in confined spaces. Authorities can prevent or slow infection by blocking possible contagious pathways, a strategy known as “Nonpharmaceutical public health interventions”, which is different from vaccines, drugs, and other medical interventions. The goal of the project, known as the “Strategies for preventing contagion”, is to deter the spread of such virus before the vaccine is available during the pandemic, so that the negative impact of disease on individuals as well as the community is ameliorated. The implementation of this strategy should consider the potential ethical ramifications and ensure participants are involved voluntarily.

In January 2006, the Journal of Emerging Infectious Diseases categorized this kind of measure into four groups: 1) Strategies for preventing the spread of the virus among countries, e.g. fever screening around the boundary, travel restrictions; 2) Strategies for reducing the spread of the virus within the nation, e.g. patient isolation, contact quarantine, cancellation of public assembly, school suspension, and other measures aimed to practice social distancing; 3) lowering personal risk of infection, e.g. develop the habit of hand-washing; 4) Risk communication with the public [3]. Furthermore, based on the studies on the 1918 Influenza Pandemic (also known as the Spanish flu), the execution of strategies for preventing contagion should be timely, continuous, and directed towards multiple fronts. [1,2]

II. Strategy Implementation

Infectious disease prevention includes twelve steps and can be categorized into two levels: a) individual/ family and b) community level.

A. Individual and family level

At the individual and family level, the encouraged methods of disease control include promotion of personal hygiene, patient isolation, contact quarantine, and household supplies storage.

Strategy one: Health promotion

This strategy should be continuously implemented at any level of the epidemic. Any health promotion efforts and should target the general public, schools, and organizations. It includes increasing the frequency of hand-washing, paying attention to respiratory hygiene and cough etiquette, staying at home if feeling sick, and proper education on the use of face mask. More information can be found at “COVID-19: Guidelines for Social Distancing”.

Strategy two: Isolation of confirmed cases

This strategy stipulates that suspected or confirmed cases should be isolated and movements restricted to certain locations; medical services should be offered in order to reduce the spread of the virus. During isolation, besides alleviating clinical symptoms, the characteristic of the current virus and possible infectious period should also be of concern. The types of isolation, and location, can be separated into medical institution isolation, home isolation, and institution isolation.

Strategy three: Contact Isolation

This strategy isolates suspected cases, restricts their movement and monitors their health status in order to reduce the spread of the virus. Depending on the scale of the pandemic, the possible quarantine options are listed below:

1. Home isolation/quarantine (self-health management): This strategy is equivalent to the concept of voluntary quarantine in other nations. People who have close contact with suspected or confirmed cases, and those who enter from infected areas should stay at home and monitored for their health status. However, family members of suspected or confirmed cases can act freely. This is the easiest way to carry out contact quarantine.
2. Group or organization quarantine: People who are not eligible for home isolation/quarantine, including but not limited to people without family members, tourists, or those with special needs, should be assigned to places designated by the local government and be quarantined by the corresponding local officer.
3. Workplace quarantine: This type of quarantine is applicable towards disease prevention staffs, healthcare professionals, and flight crews/attendants arriving from infected areas. They can still work but should be protected properly. However, when off-duty, the aforementioned persons should undergo home or group organization quarantine. According to WHO, in order to meet the ethical principles, either isolation or quarantine should be carried out voluntarily, and can only be implemented compulsorily under special circumstances.

B. Community level

Strategies at the community level include regional quarantine, enhancing public assembly, public transportation, and schools' disease control, canceling public gatherings, and closing public places. To delay the spread of and reduce the damage caused by the disease, these strategies can be applied along with social distancing measures, as well as movement restriction measurements if and when confirmed cases are on the rise. Commands regarding national contact restriction strategies should be given by National Health Command Center. Local government, medical institutions, and community organizations can discuss implementations measures prior to execution to ensure flexibility.

Strategy four: Regional quarantine

When the virus might be present within a confined place (e.g. cruise, workplace, medical organizations, etc.), and the outbreak investigator can define a specific common exposure, the authority could, if needed, carry out quarantine in that region.

Strategy five: Enforcement of disease control on public meetings or cancellation of activities

During the pandemic, the organizer of the public activities (including but not limited to school-opening ceremony, commencement, religious activities, sporting events or competitions, weddings, funerals, or political assembly) should implement the following disease control measures: educating people not to attend these events if they have respiratory symptoms or belong to high-risk groups, installing hand-washing facilities, preparing enough face masks, and strengthening advocacy. Considering the difficulty of maintaining enough social distance during public assemblies, the National Health Command Center should consider the size of the crowd, the spread of the disease in the region, and also assess the suitability of holding the events based on WHO's recommendations. When appropriate, cancellation of events should be the primary option. In the event that cancellation is not an option, reduction of crowd size or postponement of such event should be considered. More information can be found at "Guidelines for large-scale public gatherings in the wake of the COVID-19 outbreak".

Strategy six: Enforcement of disease control on public transportation

As the epidemic is reported in the community, public transportation operators should respond to these situations accordingly, since the public transportation restrict people to confined spaces. Transport operator should not only maintain their standard cleaning process but also strengthen the disease control actions such as preparing disposable gloves, face masks, and disinfecting supplies to sterilize surfaces that are constantly touched by passengers. More information can be found at "COVID-19: Guidelines for Public Transportations".

Strategy seven: School suspension or closures

In order to reduce the spread of the virus, strategies regarding “School suspension” refers to suspending classes in the unit of class, while “School closures” refers to suspending classes in the unit of school. Both measures can be applied when community outbreaks are reported since youngsters are deemed high-risk population. However, neither school suspension nor school closures can completely block the spread of disease among the community. As a result, transparent and persistent communication should take place (e.g. “We cannot expect zero cases from schools even if the class is suspended.”). During class suspension or closures, parents are responsible for protecting their child(ren) to assist in preventing further spread of the virus outside of schools. Furthermore, the educational institutions should plan a series of coordinated measures to ensure that the students’ education so that studies will continue in the pandemic. More information can be found at “COVID-19: Criteria for school suspension”, announced on February 20, 2020 by the Ministry of Education.

Strategy eight: Enforcement of disease control at public areas or shut down of public areas

During the pandemic, disease control measures should be implemented in business places. Such measures include preventing people with respiratory symptoms and high-risk individuals from entering, setting up temperature check stations at the entrance, limiting the number of visitors and maintaining social distance, requiring people to wear a face mask when entering, installing hand-washing facilities, preparing enough face masks for people who need them, sterilizing surfaces that are constantly touched by the public, and implementing disease control policies. If the pandemic deteriorates, the authority can shut down non-vital (irrelevant-to-life-sustaining) businesses, especially those with a higher risk of close contact and social distancing cannot be maintained (e.g. dance club, night club, pub, karaoke, and amusement park), in accordance with the Communicable Disease Control Act: article 37, paragraph 1. Moreover, places like libraries, museums, musical halls, or even private businesses such as department stores and theaters should be closed. More information can be found at “COVID-19: Guidelines for Management of Large Business Places”.

Strategy nine: Rapid containment

Rapid containment strategy focuses on communities that are infected by the virus. Residents in this area will undergo virus testing whether they have any contact history or not. Other public health strategies such as enforcing social distancing, strengthening surveillance should also be applied. Residents should not leave the containment zone, and only those who are under special circumstances, for example, being tested negative and has been monitored for over 14 days, can leave the area. This measure aims to eliminate newly emerged diseases in the community, and before the spread of the disease extends, the implementation of such strategy will be considered based on its necessity and possibility.

Strategy ten: Sheltering

Sheltering refers to restricting large scale social activities and is different from isolation and quarantine. This strategy aims at those who have no history of exposure rather than those who are ill; thus sheltering is usually not mandatory. It is similar to the government's announcement of school and office closures due to blizzards or typhoons, which asks people to stay at home to ensure their safety. People's compliance to the rules not only reduces their frequency of going out but also the chances of mutual contacts, which further prevents the spread of the disease. However, to maintain the fundamental social functions, decision-making should be prudent. Consider sheltering measures if the following conditions are met while the spread still continues: (1) The virus becomes highly contagious and impossible to be prevented from spreading (2) The level of community spread has reached to the extent where it is impossible to conduct close contact investigations (3) All the other disease prevention measures such as isolation, quarantine and the expansion of social distancing have been implemented.

Strategy eleven: Domestic travel restrictions

The modes of transportation include air, sea, and land transportation systems. The degree of restriction can range from issuing travel advisories to canceling transportation and taking other mandatory measures. Since the aforementioned restrictions, when enacted, may lead to a wide-ranging impacts, the Central Epidemic Command Center will consider the necessity before making a rigorous decision.

Strategy twelve: Cordon Sanitaire

Cordon Sanitaire refers to law enforcement prohibiting people from entering or leaving a community in an effort to prevent the virus from spreading to other areas. It will only be implemented in areas with a severe outbreak. Though the implementation period remains uncertain, it will depend on the needs of pandemic control, and central and local command centers will make the decision coordinately. The implementation of this measure is extremely demanding. Based on human rights and ethical considerations, unless there are special reasons, it will not be administered. Cordon Sanitaire is the ultimate means to contain the outbreak.

III. The Legal Basis

Communicable Disease Control Act

Article 37

When communicable diseases occur or are expected to occur, local competent authorities shall, by considering actual needs, take the following measures in collaboration with organizations (institutions) concerned:

1. Regulate schooling, meeting, gathering or other group activities;
2. Regulate the entry and exit of people to and from specific places and restrict the number of people admitted;
3. Regulate traffic in specific areas;

Strategies for preventing COVID-19 spread in communities

4. Evacuate people from specific places or areas;
5. Restrict or prohibit patients or suspected patients with communicable diseases from traveling by means of public transportation or entering/leaving specific places;
6. Other disease control measures announced by government organizations at various levels.

Organizations (institutions), groups, enterprises, and individuals shall not refuse, evade, or obstruct the above mentioned measures.

Measures mentioned in Paragraph 1 that shall be executed by local competent authorities shall be implemented during the period when the central epidemic command center is in place and at the discretion of commander.

IV. Social Regulation Norms

Level 1: Transition Stage

- Strategy 7: School suspension or closures
- Strategy 8: Enforcement of disease control at public areas or shut down of public areas

Level 2: Alert Stage

- Strategy 7: School suspension or closures
- Strategy 8: Shut down of public areas
- Strategy 9: Rapid containment (in the defined containment areas, residents are subject to virus screening and movement restrictions regardless of their contact history)

Level 3: Control Stage

- Strategy 7: School suspension or closures
- Strategy 10: Sheltering. People voluntarily stay at home according to the government's announcement.
- Strategy 11: Domestic travel restrictions
- Strategy 12: Cordon sanitaire

A. Strategies adopted at the current stage

1. Scenario: To prevent community spread when there happen to be a few local transmission cases with an unknown source of infection.
2. Purpose: It is necessary to advise and encourage the general public to develop habits of maintaining social courtesy, and appropriate social distancing.
3. Strategies adopted:
 - a. Strategy 1: Health promotion
 - b. Strategy 2: Isolation of confirmed cases

Strategies for preventing COVID-19 spread in communities

- c. Strategy 3: Isolation of contacts
 - d. Strategy 5: Enforcement of disease control on public meetings or cancellation of activities
 - e. Strategy 6: Enforcement of disease control on public transportation
 - f. Strategy 7: School suspension or closures
4. Practice: Formulate appropriate social distancing practices according to the current social distancing guidelines, and disseminate information to the general public.
 5. Impact: Low impact on the public and less persuasive (effective based on the persuasion principle). Indoor public spaces, restaurants, tourism and other industries may shut down due to the outbreak or the inability to maintain a sufficient social distance. Unemployment rate is likely to increase.
 6. Supplementary measure(s): Assist the affected industries with relief and revitalization policies.
- A. Level 1 Transition Stage
1. Scenario: To enhance the prevention of community spread when there happen to be a few local transmission cases with an unknown source of infection.
 2. Purpose: To prevent continuous community spread by further restricting non-vital (irrelevant-to-life-sustaining) entertainment venues and enforcing social distancing through penalties.
 3. Applicable strategies:
Strategy 7: School suspension or closures
Strategy 8: Enforcement of disease control at public areas or shut down of public areas
 4. Practice: Formulate appropriate social distancing practices according to the current guidelines, and disseminate information to the general public. Further restricting non-vital (irrelevant-to-life-sustaining) business venues and urge these premises to adopt disease control measures if necessary. For example, informing the public that those with respiratory symptoms and vulnerable populations should avoid entering the premises, taking one's temperature at the entrance, maintaining sufficient social distancing by flow control, asking the general public to wear face masks before entry, setting up hand washing facilities, ensuring there are enough face masks for those in need, disinfecting the surfaces of objects which are constantly touched, and promoting disease prevention announcements. KTV is limited to single-person or family members only. Moreover, nightclubs, bars, dance halls, and arcades must ensure the customers practice social distancing. Business premises that are unable to meet the requirements of maintaining social distancing must close down. Private and public venues such as libraries, museums,

Strategies for preventing COVID-19 spread in communities

concert halls, department stores and theaters should reinforce the maintenance of the above requirements.

5. **Impact:** Prevent large-scale community spread by further restricting non-vital (irrelevant-to-life-sustaining) entertainment venues and enforcing social distancing through penalties.
6. **Supplementary measure(s):** Provide assistance to affected industries with relief and revitalization policies. Reward business premises that are willing to abide by with the policies, despite having less customers, and enhance disease prevention measures.

B. Level 2 Alert Stage

1. **Scenario:** When clusters occur in more than three communities in a week, or when there happen to have more than ten confirmed local cases with unknown sources of infection.
2. **Purpose:** To close down nonvital and nonessential public areas and enforce the practice of social distancing to prevent a large-scale community spread.

3. **Applicable strategies:**

Strategy 7: School suspension or closures

Strategy 8: Enforcement of disease control at public areas or shut down of public areas

Strategy 9: Rapid containment (in the defined containment areas, residents are subject to virus screening and movement restrictions regardless of their contact history)

4. **Practice:** All nonessential businesses (those other than supermarkets and pharmacy) and governmental/civil services (order keeping, medical, and emergency services) must be closed. Expanded testing must be applied to the residents in communities with clustered infection and their movement must be restricted. Individuals who tested positive for the virus should be isolated in hospital for treatment. Other residents should not leave the containment area in principle, with the exception granted to special situations such as those tested negative and tracked for 14 days.
5. **Impact:** Further restrictions on non-essential business places will increase unemployment rate and precipitate the closing of these enterprises. Movement of certain residents will be bounded to an area.
6. **Supplementary measure(s):**
 - a. Help the affected industries with relief and revitalization policies.
 - b. Enhance the public's awareness and willingness to abide by social distancing through propaganda or media.

C. Level 3-Control Stage

1. Scenario: When local-transmission rapidly increase, the scale of epidemic enlarges, and most infections cannot be traced.
2. Purpose: Suspension of classes and work in an effort to cease the ping-pong effect and break the chain of transmission.

3. Applicable strategies:

Strategy 7: School suspension or closures

Strategy 10: Sheltering

Strategy 11: Domestic travel restrictions

Strategy 11: Cordon sanitaire

4. Practice: All nonessential businesses (those other than supermarkets and pharmacy) and governmental/civil services to be suspended. Set a control period of 14 days (or longer); all residents must be self-aware to stay at home and cease travel. Social distancing must be maintained at home and physical contact with one another must be avoided. Cases with suspected symptoms must be reported through the 1922 hotline and then be isolated. The goal is to stop the ongoing chain of transmission by grounding residents to home and maintaining personal social distancing
5. Supplementary measure(s):
 - a. At level-2 Alert stage, the government should begin preparing medical and vital resources that may be in shortage in stage-3 and have a plan for the supplementary measures. Meanwhile, let the public opinion mildly promote the habit of storing extra essential resources, without causing a public panic. (This leverage is a difficult one to manipulate.)
 - b. To mitigate the influences from suspension of economic activities, the duration better not be prolonged to irritate the public. Therefore the 14-day control period is critical. Seamless movement control and appropriate and compassionate supplementary measures must cease the most potential chain of transmission within the tolerance of the public.
 - c. Calming and soothing the public, as well as maintaining social order, is of top priority.
 - d. Set up a nursing facility for elders or babies for workers in essential businesses and services.
 - e. Through national and local cable channels, broadcasts and websites, regularly send out news on COVID-19 and adjust the message with a rolling plan on what the public should comply.

References

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