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COVID-19 Prevention and Control Public Health Strategies in Shanghai, China

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ABSTRACT

Context: COVID-19 was characterized as a pandemic by the World Health Organization on March 11, 2020. This research aims to analyze the public health strategies to prevent and control COVID-19 in Shanghai, China, and provide recommendations for public health policy and interventions in the United States.

Program: Based on the Social-Ecological Model, this research collected information for public health strategies from the Shanghai Municipal Health Commission and various Chinese websites.

Evaluation: The daily confirmed new cases of COVID-19 decreased from 27 to 0 in 53 days since the first case of COVID-19 was confirmed in Shanghai on January 20, 2020.

Discussion: The pattern of daily confirmed new cases suggests the effectiveness of public health strategies. This research also provides recommendations on the development and improvements of public health strategies in the U.S. by acknowledging the differences in political and social systems between the two countries.

KEY WORDS: COVID-19, public health, Shanghai

Context

Coronavirus disease (COVID-19) has been at the center of public health agendas for several months. Since December 31, 2019, when the World Health Organization (WHO) began to receive reported cases of COVID-19 detected in China, the total number of cases in China grew exponentially from 571 on January 23, 2020, to 82 724 on April 2, 2020. Total cases globally increased exponentially from 804 on February 18, 2020, to 896 450 on April 2, 2020, with 45 526 deaths.[1,2] The WHO characterized COVID-19 as a pandemic on March 11, 2020, and expects to see the number of cases, deaths, and affected countries continue to climb higher in the next few weeks.[2]

In China, the general public was not fully aware of the transmission and infectiousness of the disease in the early stages of the outbreak. The first case of COVID-19 was identified on December 8, 2019, and the first 4 cases were all linked to a large seafood and live animal market in Wuhan, Hubei Province, China, suggesting animal-to-person transmission.[3,4] By middle December 2019, the human-to-human transmission had occurred among close contacts, as a growing number of patients reported that they did not have exposure to animal markets.[4] It was on January 20, 2020, that the human-to-human transmission information was announced to the public.[5] The time delay in announcing the human-to-human transmission of the virus hindered the prevention and control at an early stage of its spread.[4] Thus, strenuous and aggressive public health strategies were taken afterward to prevent the illness from spreading.

While different places in China have taken a variety of public health strategies to prevent and control the virus from spreading, we chose Shanghai as an example to demonstrate the measures and their effectiveness for 2 reasons. First, Shanghai has a relatively small number of locally transmitted cases and a high recovery rate among patients infected by the coronavirus, a role model for other major cities and provinces in China. Second, Shanghai is one of the biggest, most populated, and most internationalized cities in China. Shanghai's public health strategies and experience can be useful to other large cities around the world.

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Program

The public health strategies taken by Shanghai, China, are illustrated later based on the Social Ecological Model (SEM).[6] The central proposition of the SEM emphasizes explicit consideration of multiple levels of influence and interventions, including individual, interpersonal, organizational, community, and societal levels.[6]

Societal level

At a societal level, we focused on the reporting system and quarantine reinforcement, public health education through mass media and social media, educational system support, and customs support. Other strategies are listed in Table 1.

Reporting system and quarantine reinforcement

Shanghai implemented a comprehensive reporting system called "zero reporting" with a focus on 3 groups: (1) people who are undergoing quarantine and observation after returning from key regions severely affected by the COVID-19 pandemic; (2) people who return to Shanghai to work in the fields of education, property management, logistics and public transportation, medical services, home services, nursing, and labor-intensive plants and companies; and (3) people who travel to Shanghai from other regions.[7]

Shuttles at the city's 2 international airports pick up people arriving from areas severely affected by the coronavirus pandemic and take them home immediately for a 14-day quarantine. If a person chooses to be picked up by a private car, the driver and any accompanying persons must register in advance with district officials with their names, ID cards, contact information, car plate number, and destination. Twenty-four-hour registration and pickup services are offered at both Shanghai airports. Staff from health service centers, neighborhood committees, police, and foreign language translation volunteers visit them in their homes, and they are asked to sign a home quarantine promise letter.[8]

People in Shanghai can also scan a QR code generated by the Shanghai Municipal Transportation Commission unique in each taxi or metro train compartment to register their information. The registration is not mandatory, and the information is only used to quickly locate travelers in the event of possible coronavirus exposure, a measure to control coronavirus spread.[9-11]

Public health education through mass media and social media

Offering enhanced risk communication and health education about the outbreak response through mass media and social media campaigns is a critical strategy in developing and implementing effective health promotions for the general public. The local health authority in Shanghai launched a variety of TV programs and online courses to educate the public. In the daily coronavirus news conference held by the Shanghai government,[12] medical experts were invited to promote knowledge of health care and disease prevention and control as well as to ease people's worries. One online course that provides practical measures to clean and disinfect living areas received 600 000 viewers concurrently.[13] The municipal government also broadcasted prevention messages on the exterior lighting of high-rise buildings (see Supplemental Digital Content Figure 1, available at http://links.lww.com/JPHMP/A661).[14]

The local Shanghai government used its official WeChat (one of the most popular Chinese micromessaging applications) account to provide daily updates of the pandemic, including total cases, new confirmed cases, deaths, travel histories of confirmed cases, recovered cases, new policies, community interventions, and health promotions (see Supplemental Digital Content Figure 2, available at http://links.lww.com/JPHMP/A662).[15] People checked dynamic outbreak changes and updates easily and quickly through mobile phones. The government also offered health promotions and education, such as information to identify early symptoms, personal hygiene indoors and in public, how to wear masks correctly, mental health awareness, health quizzes with rewards, Q&A with physicians, and specialists' recommendations to encourage the public to engage in self-protection, prevent spreading the virus to others, and act appropriately in response to the outbreak.[15]

Educational system support

According to the Shanghai Municipal Education Commission,[16] all universities and primary and secondary schools in Shanghai launched online education on March 2, 2020, to help control the novel coronavirus pandemic. A unified teaching schedule was adopted by all primary and secondary schools in Shanghai. Online courses recorded by more than 1000 teachers across the city have been broadcast on TV across 12 channels (see Supplemental Digital Content Figure 3, available at http://links.lww.com/JPHMP/A663).[17,18] Students watch live classes and replay on TV or online. Students at colleges and universities in Shanghai take online courses delivered by their instructors.[17,18]

Teachers used WeChat to communicate with parents and keep track of students' health conditions. For example, Supplemental Digital Content Figure 4 (available at http://links.lww.com/JPHMP/A664)

TABLE 1
Confirmed new Cases and Corresponding Public Health Strategies Taken Each day

Date	Confirmed New Cases	Events & Implementation of Public Health Strategies
1/20/2020	1	The first case of COVID-19 was confirmed in Shanghai, China.
1/21/2020	8	
1/22/2020	7	Public gatherings were banned, and significant events canceled.
1/23/2020	4	Travel restrictions were implemented, including traffic restrictions and most transportation suspended, including airports, ports, train stations, bus stations, and Metro.
1/24/2020	13	The Shanghai Government announced the launch of a Level-1 response of Public Health Emergency of National Concern.
1/25/2020	7	People who traveled to Hubei recently were told to self-quarantine in a hotel for at least 14 days and report to the hospital if any symptoms appeared.
1/26/2020	13	
1/27/2020	13	The national health commission team began to supervise and inspect the prevention of COVID-19. The shutdown of the workplace was prolonged. School class start dates were delayed.
1/28/2020	14	
1/29/2020	21	
1/30/2020	27	
1/31/2020	25	Health protection guidelines for COVID-19 were issued. Travelers complied with temperature measurements and health status registrations when they entered Shanghai.
2/1/2020	24	People who traveled to Hubei recently were tracked, and their health status was monitored in real-time.
2/2/2020	16	Mass media and social media were used in public health campaigns for health communication, such as TV programs, posters, text messages, Weibo, WeChat, etc. to provide health education.
2/3/2020	15	
2/4/2020	25	24-hour online mental health counseling services were provided. A national emergency medical rescue team formed to supervise and respond to the outbreak, including disease prevention, control, screening, treatment, and quarantine.
2/5/2020	21	People were not allowed to enter the Metro station without wearing a mask.
2/6/2020	15	People entering the community, enterprises, or offices were processed with spray disinfection.
2/7/2020	12	The authorities started daily reporting of regions or areas with confirmed cases through a mobile application.
2/8/2020	11	
2/9/2020	3	Central air-conditioning and ventilation systems were suspended in most public places. The regular cleaning and disinfecting of central air-conditioning/ventilation systems began in non-public places.
2/10/2020	7	Individual access cards/passes were required when people entered or departed the community. Access to the city for non-Shanghai residents was suspended.
2/11/2020	4	Most offices began to return to work.
2/12/2020	7	
2/13/2020	5	
2/14/2020	8	
2/15/2020	2	
2/16/2020	3	
2/17/2020	2	Digital/dynamic application was used in health status registration and monitoring when people entered or exited their communities.
2/18/2020	0	Most schools restarted by transitioning to online instruction.
2/19/2020	0	Plasma was collected from the first patient who recovered from COVID-19.
2/20/2020	1	
2/21/2020	0	
2/22/2020	1	
2/23/2020	0	
2/24/2020	0	

TABLE 1

Confirmed new Cases and Corresponding Public Health Strategies Taken Each day (*Continued*)

Date	Confirmed New Cases	Events & Implementation of Public Health Strategies
2/25/2020	1	
2/26/2020	1	
2/27/2020	0	
2/28/2020	0	
2/29/2020	0	
3/1/2020	0	
3/2/2020	1	
3/3/2020	0	
3/4/2020	0	All passengers who traveled from or lived in South Korea, Italy, Iran, or Japan, before entering Shanghai, conducted home or centralized health surveillance for 14 days.
3/5/2020	1	
3/6/2020	3	
3/7/2020	0	
3/8/2020	0	
3/9/2020	0	
3/10/2020	2	
3/11/2020	0	
3/12/2020	2	

shows that a teacher asked parents to check-in by 9:00 AM every day using a calendar function on WeChat. Parents reported whether students were staying home and whether they had any symptoms, such as fever, cough, or breathing difficulty.

Customs support

According to the local authority, more than 300 customs professionals in Shanghai had been dispatched to conduct epidemiological investigation.[19] Passengers were asked to report on a health declaration card whether 2 or more family members or colleagues had a fever or other symptoms and whether they had taken an antipyretic or cold medicine in the past 3 days. Customs officials boarded aircraft to check passengers' temperature and the information passengers completed on the health form. Customs officials placed a green label on a passport to indicate the traveler was from a region with minor epidemic conditions. Those with red and yellow stickers traveled from key coronavirus-affected regions and were required to undergo further screening and checks. Quarantine zones at the ports were improved and expanded. Customs clearance was readjusted to cope with masses of passengers. Temperature-sensing devices have also been upgraded to alert both higher and lower temperatures than the normal range.

China's General Administration of Customs opened special counters and green lanes for the fast clearance of imported antiepidemic supplies. With appropriate and effective supervision, officials released supplies upon registration to facilitate quick pickup and minimize clearance time.

Community level

The community health service centers, in collaboration with local towns and neighborhood committees, promote and guide health management for residents in its jurisdiction. The family doctor team of each community health service center used mobile apps, WeChat, phone, text messages, and other channels to track the health status of contracted residents actively. These procedures enabled local physicians to understand patients' needs, offer guidance in personal health management, and provide health educational and psychological services.

Community Health Service Centers teach residents how to carry out preventive measures, such as cleaning, disinfection, hand washing, wearing masks, and ventilation. Communication is provided through phone calls, posters, banners (see Figure 1), handouts (see Figure 2),[20] community broadcasts, electronic displays, bulletin boards, WeChat, Weibo (the most popular microblogging Web site in China), and other forms.

Community Health Service Centers also share health tips and self-protection knowledge, promptly respond to health counseling requested by residents,

FIGURE 1 Banners on COVID-19 in four Languages Outside a Neighborhood ("Reduce Outdoor Activities, Wash Hands Frequently, and Wear a Mask")

help eliminate residents' concerns, ensure that "everyone knows, everyone acts, and everyone helps prevent and control COVID-19." These actions create a positive and scientific community atmosphere to achieve epidemic prevention and control. Also, the centers promote a healthy diet, indoor physical activities, personal hygiene habits, and ways to maintain healthy living.

FIGURE 2 Promotional Leaflets on COVID-19 Designed by the Shanghai Center for Health Promotion[20] (Left: Coronavirus Prevention Tips when Using an Escalator. Center: Coronavirus Prevention Tips for Everyday life. Right: Handwashing to Prevent Coronavirus)

Besides community health service centers, neighborhood committees play an important role in prevention efforts. Some communities used health care providers to train neighborhood committee staff on coronavirus prevention and control. Some neighborhood committees used speakers to broadcast coronavirus prevention and control information to residents at home (see Supplemental Digital Content Figure 5, available at http://links.lww.com/JPHMP/A665).[21] They also worked with property management agencies and volunteers to post educational information posters in communities (see Supplemental Digital Content Figure 5, available at http://links.lww.com/JPHMP/A665).[21]

Neighborhood committees maintained contact with people who visited or returned to Shanghai in 2 ways. First, on the basis of the immigrant population registration form, neighborhood committees contacted the people who came to Shanghai to understand their itinerary. Second, each neighborhood committee established a neighborhood mutual aid mechanism in which residents, neighbors, or family members could report or verify information about their personal or business trips to a list of affected countries or regions.

Neighborhood committees, working with property management agencies and volunteers, also actively provided various services to residents self-quarantined at home.[22] Neighborhood committee members recorded the temperature of self-quarantined residents and checked their health by telephone or a visit (with social distancing) every day. Meanwhile, committees also supported the daily life of self-quarantined residents by attending to their emotions, replenishing their daily necessities, delivering meals or online orders, and collecting and disposing of trash. Under the guidance of epidemic prevention professionals, neighborhood committees organize community social workers, property management teams, and volunteers to disinfect the community's public areas, such as corridors and playgrounds.

Neighborhood committees working with property management agencies have issued passes to differentiate residents from visitors quickly (see Figure 3). Hundreds of thousands of workers and volunteers check residents' temperatures (see Figure 4),[21] log their movements, and oversee quarantines to prevent the spread of the virus. People from key infected areas both in China and outside China undergo a 14-day quarantine.[22]

Organizational level

Seven hospitals in Shanghai were licensed to provide online diagnoses and prescriptions starting February 29, 2020. Prescribed medications were delivered from the hospital's pharmacy to patients' homes. Patients were able to pay for registration and medical fees through medical insurance online. These 7 hospitals

FIGURE 3 An Entry-Exit Pass as part of the Coronavirus Prevention Measures by a Property Management Agency

FIGURE 4 Community Neighborhood Committee Workers and Volunteers took a Resident's Temperature before he Drove back to his Neighborhood[21]

offered more than 7800 diagnoses and 1450 prescriptions online in the first 2 weeks. Shanghai also set up a one-stop fever consultation platform (phone calls and a WeChat mini-program) made up of more than 90 physicians from 15 local hospitals working in shifts. Online inquiries were free of charge.[23] The Shanghai Health Commission's medical administration department used information technology to supervise Internet medical service providers and ensure quality and safety.

Beginning January 16, 2020, many public places in Shanghai were closed, such as public libraries, community-based cultural activity centers, amusement facilities, and sports venues.[24] Most tourist attractions suspended operations, and all large public activities were suspended. Despite the cancelation of events and closure of cultural venues, the city provided more online access to arts and recreation. Several museums in Shanghai offered online exhibitions, lectures, and forums.

Individual level

Good personal hygiene habits and proactive prevention are the keys to staying healthy. On January 20, 2020, Dr Nanshan Zhong, a Chinese pulmonologist and leading advisor in managing the COVID-19 pandemic crisis, advised the public to wear masks, given the potential signs of human-to-human transmission of COVID-19.[25] The local government advised people to open windows, wash hands frequently, wear a mask, maintain good sleep habits, stay calm, and refrain from shouting or spitting in public spaces. When coughing, a person should turn his or her face away from others and cover his or her mouth and nose

with a tissue or upper sleeve. While there has been a long history for Chinese people to share dishes, during the outbreak of COVID-19, the Shanghai government launched a campaign to promote the use of serving chopsticks and spoons and not to stir shared dishes with one's own chopsticks.[12]

Evaluation

Figure 5 shows the epidemic curve of the confirmed new cases of COVID-19 in Shanghai[26] In Table 1, public health strategies are listed with the corresponding details of confirmed new cases.

Discussion

Shanghai demonstrated effective public health strategies during the virus outbreak and provided lessons from which the United States can learn. However, strategies need to be developed that better fit characteristics of the United States. On the basis of the SEM,[6] we listed additional potential recommendations at the societal, community, and organizational levels.

Societal level

The societal-level recommendations were listed in Table 2.

Community level

The United States has ethnically diverse communities. The United States needs to increase awareness and knowledge about the virus and prevention measures in each ethnic community in their specific cultural context.

For mainstream communities in the United States, address beliefs in individualism, autonomy, and independence that are rewarded and respected.[27] The cultural norm would be upheld in promoting that taking precautions is not a demonstration of weakness or cowardness but a heroic action to protect oneself and others through precautionary measures, such as wearing masks, getting tested, or self-quarantine.

For specific minority communities, all information should be translated into different languages to communicate with each community. Use back translation, which is a procedure where people interpret a document previously translated into the target language back into the source language to check the accuracy of the translation and the readability of the information.[28]

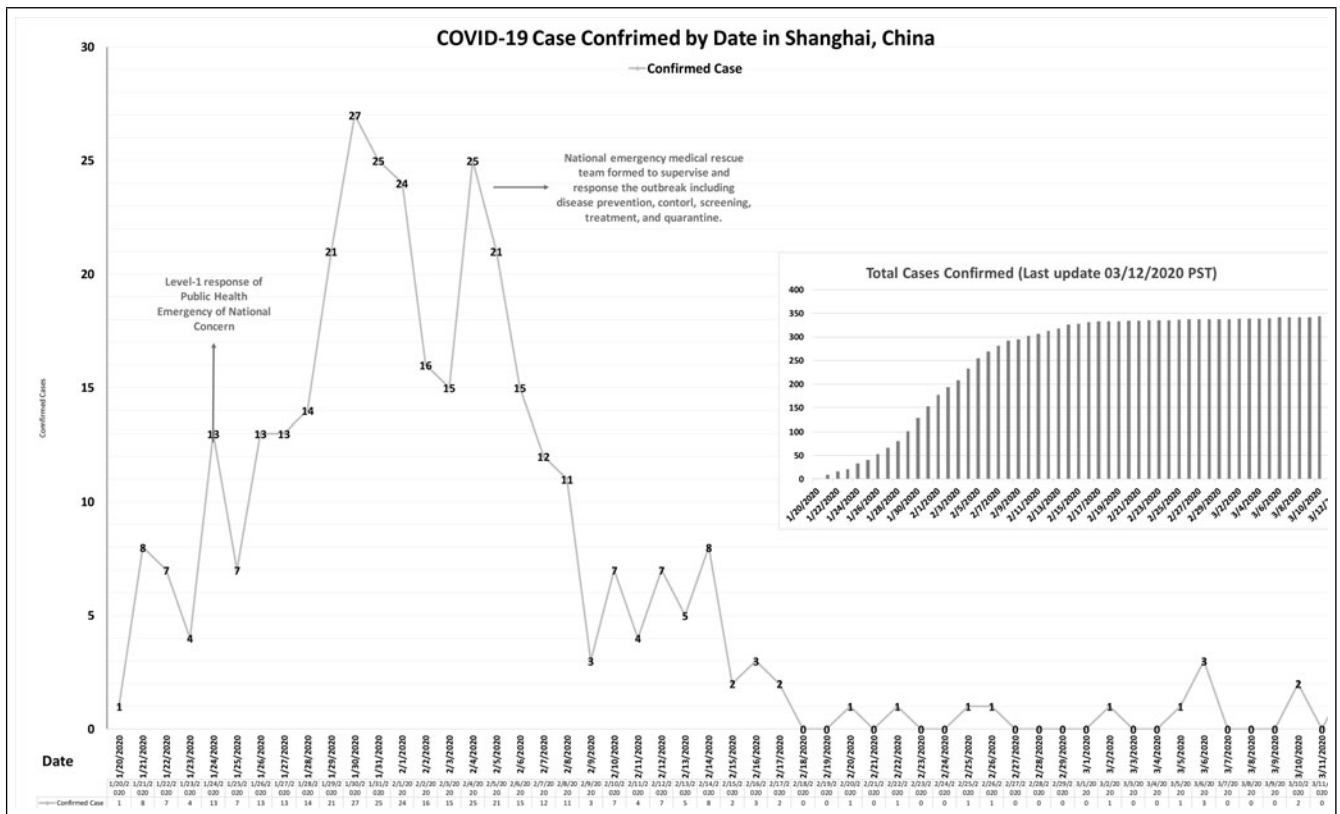Moreover, it is important to address various cultural norms and increase cultural competency when

FIGURE 5 Epidemic Curve of the Confirmed Cases of Coronavirus Disease from January 20th to March 12th in Shanghai[26]

communicating with diverse communities. Asian and Hispanic/Latino communities are used as examples in the following text.

It is crucial to address the stigma, racism, discrimination, prejudice, and xenophobia against the Asian population, resulting from the country of origin where the disease was first discovered and spread. However, there were many breakthroughs in controlling the virus that initiated in China as well. In China, wearing a mask was mandatory to curb the spread of coronavirus[29] due to the long incubation period. People who carry the virus without realizing it can spread the virus. Wearing a mask is a way to protect not only themselves but also the people around them.[30,31]

TABLE 2
Societal Level Recommendations

- Enhance the reporting system. The U.S. can learn from Shanghai's "zero reporting" mechanism with registration and contact tracing systems.

- To the general public, the U.S. can provide a timely update about the incidence and prevalence of the disease with geographic information, a brief history of the virus for each patient, and testing methods and places on local county departments of public health and Centers for Disease Control and Prevention websites.

- Press conferences and news reports should be used to form a media plan that leads to a public agenda. When speaking to the public, officers need to be aware of the audience's health literacy level and try to avoid jargon.

- Create or update social media accounts of public health departments that people can follow and read easily, even on their mobile phones. Synchronize social media content with website content. Monitor social media content to control rumors.

- Develop health-specific applications. For example, a mobile application for tracking and self-reporting health status and daily life needs for quarantined people, self-quarantined people, or those who have coronavirus but show mild symptoms and chose to stay home for self-care.

- Providing support for medical and mental health consultations through hotlines is critical for self-quarantined or quarantined people.

TABLE 3
Community Level Recommendations
• Set up posters, banners, electronic screens, or billboards in communities.
• Contact and support homeowners' associations or other community agencies to send out flyers and handouts to residents.
• Post information on neighborhood or community networking websites, such as *nextdoor.com*.
• Create anonymous online communities or groups on social media to provide social support to people who need to be quarantined or self-quarantined themselves at home.
• Establish official accounts in various social media that different ethnic communities use (for example, Facebook, Twitter, Instagram, Snapchat, etc. for mainstream communities; WeChat for the Chinese community; and Kakao for the Korean community).

However, other ethnic groups might not understand the reasons for wearing masks. Thus, we need to increase the awareness of the values behind wearing masks among the general public and confirm that it is a preventive measure not only for themselves but also for their communities.

Moreover, Asian cultures value family members and the community. The United States can focus on the importance of protecting loved ones, families, and communities. When designing health communication messages, US media can include pictures or videos of community members wearing masks or washing hands together. Videos can also be created in each ethnic language from community leaders and sent through social media prevalently used among those ethnic groups.

TABLE 4
Organizational Level Recommendations
Hospitals, Community Health Centers, and Other Clinics
• Reported cases should be communicated within hospitals, community health centers, and other clinics to alert medical care teams to take precautions.
• Hospitals, community health centers, and other clinics can email all customers with flyers and links to authoritative websites.
• Posters, banners, or electronic billboards with prevention measures can be set up in most facilities.
• Mobile apps, phone calls, text messages, and other channels should be used to track the health status of patients actively, understand their needs, offer guidance in personal health management, and provide health educational and psychological services.
Schools
• Communicate with students and parents (if students are under 18) about the virus, updated cases, preventive measures from authorities (eg, county departments of public health, Centers for Disease Control and Prevention [CDC], WHO) and check the students' health status via email, phone calls, or text messages.
• Communicate with faculty and staff about how to support their students. Teach students preventive measures that fit their literacy level.
• If schools moved to online teaching, they need to enable teaching mechanisms and provide support via email to all students and faculty members.
• Ensure IT's rapid response communications with students, faculty, and staff to support online teaching through instant communication channels, for example, via phone calls and live chat during classes.
• Establish an online communication system and policies to foster the virtual learning environment and give support to everyone in the school.
Other Workplaces Including Companies and Agencies
• Provide intra-organizational communications in news centers or newsrooms and via mass emails with regular updates about the virus with the link from the local county departments of public health and the Centers for Disease Control and Prevention.
• Form an online community through intranets, social media, mobile applications, or other online platforms to provide not only information but also emotional support to each other and form solidarity within the organization.
• Send out emails to all previous or current customers about preventive disinfection and cleaning measures taken within the organization.

Implications for Policy & Practice

■ At societal level, we recommend enhancing the reporting system with registration and contact tracing; and performing health communication via different channels to the general public.

■ At community level, we recommend culturally appropriate approaches that fit each community.

■ At organizational level, we recommend a variety of practices for (1) hospitals, community health centers, and other clinics, (2) schools, and (3) other workplaces including companies and agencies.

Hispanics also highly value close, broadly defined, and emotionally supportive families (*familismo*). Furthermore, respect (*respeto*) is fundamental to communication in this community.[32] Thus, we can portray Hispanic/Latino elders in the family wearing masks or washing hands together with younger generations.

Some suggestions on public health strategies for all communities are shown in Table 3.

Organizational level

Different organizations and institutions need to establish self-quarantine or quarantine reporting, monitoring, and support systems within organizations to provide support, stop rumors, and avoid panic within the organization. Also, we need to offer different measures to (1) hospitals, community health centers, and clinics, (2) schools, and (3) workplaces, including companies and agencies (see Table 4).

Conclusion

Every county needs to learn and take action in response to the pandemic of the novel coronavirus. This research summarized the effective public health strategies adopted in Shanghai, China, based on the SEM to shed light on the possible development and improvements of strategy in the United States. Differences in the political and societal systems between China and the United States need to be acknowledged when reviewing and applying these measures.

We also recognize the following limitations of the study. We collected information about public health strategies in China from official Web sites and social media accounts and the experiences of community health education practitioners. This research might not reflect an exhaustive list of all the public health strategies taken in Shanghai. Other measures taken by the health care and pharmaceutical industries were not included in our analysis and may contribute to the control of the disease.

Although we provided generic recommendations for health communication measures to prevent and control COVID-19 from spreading in the United States, each region needs to adapt these suggestions by considering characteristics of the local, political, and social systems and cultural practices and preferences.

References

1. World Health Organization. Coronavirus disease 2019 (COVID-19) situation report—73. https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200402-sitrep-73-covid-19.pdf?sfvrsn=5ae25bc7_2. Published April 2, 2020. Accessed April 2, 2020.
2. World Health Organization. Coronavirus disease 2019 (COVID-19) situation report—52. https://www.who.int/docs/default-source/coronaviruse/20200312-sitrep-52-covid-19.pdf?sfvrsn=e2bfc9c0_4. Published March 12, 2020. Accessed April 13, 2020.
3. World Health Organization. Coronavirus disease 2019 (COVID-19) situation report—37. https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200226-sitrep-37-covid-19.pdf. Published February 26, 2020. Accessed April 13, 2020.
4. Li Q, Guan X, Wu P, et al. Early transmission dynamics in Wuhan, China, of novel coronavirus–infected pneumonia. *N Engl J Med.* 2020;382:1199-1207.
5. Ding L, Cai W, Ding J, et al. An interim review of lessons from the Novel Coronavirus (SARS-CoV-2) outbreak in China. *SCIENTIA SINICA Vitae.* 2020;50(3):247-257.
6. Bronfenbrenner U. Toward an experimental ecology of human development. *Am Psychol.* 1997;32(7):513-531.
7. Cai W. Shanghai tightens health reporting mechanism. *Shine.* February 21, 2020. https://www.shine.cn/news/metro/2002212508. Accessed April 13, 2020.
8. Min Hu. New measures announced for arriving passengers. *Shine.* March 7, 2020. https://www.shine.cn/news/metro/2003073694/. Accessed April 10, 2020.
9. Wu Z, Zhong Y, Jiang X. Metro QR code launched to track coronavirus. *Shine.* February 28, 2020. https://www.shine.cn/news/metro/2002283031. Accessed April 13, 2020.
10. Ruofan W, Huizhi C. QR codes now in taxis to track passengers. *Shine.* February 21, 2020. https://www.shine.cn/news/metro/2002212502. Accessed April 10, 2020.
11. Huaxia. Shanghai offers health QR codes in public transport. *Xinhua Net.* February 25, 2020. http://www.xinhuanet.com/english/2020-02/25/c_138817911.htm. Accessed April 10, 2020.
12. Shanghai Municipal People's Government. Alert and reflection on COVID-19 and a joint proposal to all citizens in Shanghai by multiple government departments. http://www.shanghai.gov.cn/nw2/nw2314/nw32419/nw48516/nw48539/u21aw1427006.html. Published February 24, 2020. Accessed April 13, 2020.
13. Cai W. Online course showcasing disinfection and virus control. *Shine.* March 03, 2020. https://www.shine.cn/news/metro/2003033349/. Accessed April 13, 2020.
14. Mu B, Li Z. Faced with the "COVID-19" epidemic, in addition to Zhang Wenhong, these Shanghainese are also very accentuated. Tencent News. January 30, 2020. https://new.qq.com/omn/20200130/20200130A077TG00.html. Accessed April 10, 2020.
15. Shanghai Municipal Health Commission. Healthy Shanghai 12320 official WeChat account. WEMP. https://wemp.app/accounts/ba60c942-f2f9-4282-988f-0fbe8dff047c. Accessed April 12, 2020.
16. Shanghai Municipal Education Commission. Universities, primary and secondary schools in Shanghai will launch online courses from March. http://edu.sh.gov.cn/html/article/202002/105089.html. Published February 18, 2020. Accessed April 13, 2020.
17. Shanghai Municipal Education Commission. "Classroom in the Air" online education for primary and middle school students has been launched. http://edu.sh.gov.cn/html/article/202003/105435.html. Published March 2, 2020. Accessed April 13, 2020.

18. Huaxia. Shanghai universities, schools to launch online courses from March. Xinhua Net. February 18, 2020. http://www.xinhuanet.com/english/2020-02/18/c138795870.htm. Accessed April 13, 2020.

19. Shanghai Municipal People's Government. Six steps to keep you and us safe. http://www.shanghai.gov.cn/shanghai/n46669/n48081/u22ai128285.html. Published March 10, 2020. Accessed April 10, 2020.

20. Office of the Leading Group for Prevention and Control of Pneumonia Outbreaks of New Coronavirus Infections in Shanghai. Shanghai Center for Health Promotion. http://www.shanghai.gov.cn/nw2/nw2314/nw2319/nw32905/nw32914/nw32994/nw33014/nw40051/index.html?pageindex=0. Published March 11, 2020. Accessed April 10, 2020.

21. Qingpu Municipal Health Commission. Qingpu Municipal Health Commission new voice official WeChat account. WEMP. https://wemp.app/accounts/6c4519e6-632f-4d03-8bef-b625a9ee9714. Accessed April 12, 2020.

22. Meiping Y. A day in the life of a neighborhood coping with quarantine. Shine. March 16, 2020. https://www.shine.cn/news/metro/2003164368/. Accessed April 10, 2020.

23. Ding Y, Zhou S, Zhong Y. Online diagnosis reduces hospital visits. Shine. March 9, 2020. https://www.shine.cn/biz/economy/2003093841/. Accessed April 13, 2020.

24. Hu M. Strictest public health measures imposed. Shine. January 23, 2020. https://www.shine.cn/news/metro/2001240537/. Accessed April 13, 2020.

25. Haizhi X. Novel coronavirus infection pneumonia epidemic: human-to-human and medical personnel infections have been confirmed. Xinhua Net. January 20, 2020. http://www.xinhuanet.com/politics/2020-01/20/c_1125487200.htm. Accessed April 3, 2020.

26. 2019-20 coronavirus pandemic in Shanghai. Wikipedia. https://en.wikipedia.org/wiki/2019%E2%80%9320_coronavirus_pandemic_in_Shanghai. Accessed April 13, 2020.

27. Ritter LA, Graham DH. Worldview and health decisions. In: Ritter LA, Graham DH, eds. Multicultural Health. 2nd ed. Burlington, MA: Jones & Bartlett Learning; 2017: 55.

28. World Health Organization. Process of translation and adaptation of instruments. https://www.who.int/substance_abuse/research_tools/translation/en/. Published 2010. Accessed April 13, 2020.

29. ChinaNews. It is illegal to not wear a mask and violate the quarantine regulations during the COVID-19 outbreak? The Judge said. ChinaNews. February 3, 2020. https://m.chinanews.com/wap/detail/zw/sh/2020/02-03/9077593.shtml. Accessed April 13, 2020.

30. Oaten M, Stevenson RJ, Case TI. Disease avoidance as a functional basis for stigmatization. Philos Trans R Soc Lond B Biol Sci. 2011;366(1583):3433-3452.

31. Sim SW, Moey KS, Tan NC. The use of facemasks to prevent respiratory infection: a literature review in the context of the Health Belief Model. Singapore Med J. 2014;55(3):160-167.

32. Ritter LA, Graham DH. Hispanic and Latino American populations. In: Ritter LA, Graham DH, eds. Multicultural Health. 2nd ed. Burlington, MA: Jones & Bartlett Learning; 2017:151.