The COVID-19 Pandemic

Originally published March 27, 2020

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Key Public Health Strategies for Responding to COVID-19

There are three key public health strategies critical to combatting the COVID-19 pandemic: testing, contact tracing, and social distancing. These strategies have been implemented with varying degrees of intensity and using different approaches across the countries that have reduced their infection rates. Nonetheless, it is clear that a combination of all three approaches has been needed to limit infections in all of these locations.

What public health strategies are effective?

Testing & Isolation

Testing in the U.S. is currently reserved for those with specific symptoms and/or exposures. There is no available antibody test to inform prior exposure. Expanding criteria for testing would allow timely identification of cases and enable estimates of disease prevalence. Testing needs to be combined with a clear approach for **isolation** of confirmed or suspected COVID-19 cases either at home or in another designated place that eliminates/minimizes contact with others. This may also include regularly scheduled check-ins by medical or public health authorities.

Contact Tracing & Quarantine

Contact tracing involves extensive interviewing of suspected/confirmed cases to identify individuals who may have been exposed to them. Close contacts may require monitoring and self-quarantine. Definitions have varied, but in general close contacts are members of the same household, and those who travelled with or who spent at least 30 minutes within 6 feet of a suspected/confirmed case starting 2 days before symptoms onset. **Quarantine** may also be applied for individuals who have traveled to certain locations, and may include regular check-ins by medical or public health authorities.

Social Distancing

Social distancing is a broad range of interventions, including recommending that individuals maintain distance from others (minimum 6 ft.), closing schools and businesses and limiting exposures that may occur through daily activities such as grocery shopping or exercise, and other interventions like the use of masks.

Consistently, however, with a combination of these public health approaches, countries have been able to bend the curve on the epidemic.

China

China's strategy was strongly focused on identifying all possible cases and contacts and implementing strict isolation and quarantine to reduce the opportunity for infection, including some different approaches in different regions of the country. Testing was rapidly scaled up and results were made available within the same day. China also expanded their testing to take advantage of ongoing surveillance systems for influenza-like illness, finding a 10% positive test rate with widespread testing by the beginning of January. Community fever monitoring, screening at typically crowded locations such as train and bus stations, and close, in-home observation were cornerstones of the effort.

Through contact tracing, public health officers were able to observe that the greatest number of clusters occurred in families, with 3-10% of household members becoming ill. When all close contacts were identified and tracked, between 1 and 5 percent were or became positive. As they identified cases, China admitted them into 45 specific hospitals, some of which were designated for mild and some for critical or severe patients.

Close contacts of cases were also quarantined under medical observation to see if they developed symptoms. In Shenzhen, close contacts were identified as individuals who lived together, traveled or had socially interacted with a case during the period 2 days before symptoms were noted. All close contacts were tested regardless of symptoms and those that tested negative were isolated at home or a central facility and monitored for 15 days.

In terms of social distancing, borders were controlled and citizens were mandated to stay at home and engaged in education regarding universal temperature monitoring and handwashing. All citizens wore masks in public and home support mechanisms were put in place, including food and medicine delivery. The medical capacity, including new hospitals and use of reserve beds, was centrally tightly coordinated.

China was able to decrease median time from symptom onset to laboratory confirmation from 12 to 3 days, which helped to substantially reduce infection rates (shorter time to isolation) and provide medical care to those in need. Within 14 days, they observed an impressive decline from 2,478 to 409 newly confirmed cases per day, and a steep decline in fever clinic visits attributed to aggressive identification and isolation of suspect and confirmed cases, quarantine of close contacts, and social distancing.

In China, 50,000 infected patients remained under observation during the response to the epidemic and Chinese authorities were not letting up on preparations – indeed, every city, province and community continues to urgently escalate their investments in acute care beds and public health capacity.

Singapore

In Singapore, testing was performed in all cases of acute respiratory illness (ARI) and all cases of exposure within 14 days via travel history or close contact with a patient. An enhanced surveillance system tested all patients with pneumonia, ICU patients with possible infections and later, outpatient cases with influenza-like illness as well as other respiratory illnesses at the provider's discretion. Contacts of cases were quarantined and monitored for 14 days if asymptomatic and tested if symptomatic. Other contacts with less exposure were monitored without quarantine for 14 days. Although borders were closed, and community education provided, schools were not closed.

Public health initiatives were effective, with more than 50% of cases identified through contact tracing, while 20% were identified via the case definition at medical consult, 16% through enhanced surveillance, 11% through provider clinical discretion. Newly identified cases decreased after one month, but cases have continued to occur, mainly from travelers and the island currently has more than 200 positive cases. All nonessential travel is now discouraged.

South Korea

By mid-March, South Korea was performing about 20,000 tests daily, with a total of 290,000 tests, including of asymptomatic individuals, providing some of the best estimates to date of asymptomatic presence of infection. Contact tracing was intensive, using multiple modalities to find all potential contacts.

Taiwan

Taiwan also did comprehensive contact tracing and provided food, frequent health checks, and encouragement for those under quarantine. The country also increased production of face masks. Schools reopened after an extended break with guidelines for suspension if new cases were identified in the school. Provisions for social distancing within schools were also made.

Details of the measures taken in Singapore, South Korea, and Taiwan are in the chart below.

The Takeaway

Although each public health intervention (testing and isolation; contact tracing and quarantine; and social distancing) has a standard definition, each has been implemented in different ways and with varying intensities across the globe. Consistently, however, with a combination of these public health approaches, countries have been able to bend the curve on the epidemic. Each approach should be considered and implemented in concert with the others in a manner that takes into account the specific needs and cultural realities of a particular area.

Notes: Strategies for combating the spread of COVID-19 and their likely effectiveness, a review of models for forecasting the spread and severity of COVID-19, and other topics will be the subject of additional working papers. The views expressed are those of the advisory group and do not necessarily reflect the views of Vanderbilt University School of Medicine or Vanderbilt University Medical Center. Please see vumc.org/health-policy/covid-19-advisory-memos for those papers.

PUBLIC HEALTH STRATEGIES AROUND THE GLOBE

How 4 countries in Asia have responded to the COVID-19 pandemic.

	Testing & Isolation	Contact Tracing & Quarantine	Social Distancing
China 	Widespread within one month of outbreak reaching 1.6M / week; positive patients isolated in designated hospitals; symptomatic test negative patients were also isolated. In Shenzhen, there was extensive screening of those with symptoms.	The cornerstone of China's approach involved more than 1,800 teams tracing tens of thousands of contacts daily; close contact in quarantine for 14 days. In Shenzhen all close contacts were tested regardless of symptoms.	Canceled mass gatherings, controlled transportation and in some cases severely limited mobility of individuals in public. Citizens also wore masks and food and medicine were delivered.
Taiwan 	Travel histories of patients made available to all hospitals, clinics and pharmacies; Targeted testing available at 8 hospitals by late January. Daily testing ~1,300 samples by mid-February.	Extensive contact tracing implemented for all cases; quarantine and electronic monitoring of high-risk individuals; provided food, frequent health, checks, encouragement for quarantined.	Increased mask production and set limits on mask prices. Tight border control. Schools reopened after an extended break with guidelines for suspension if new cases were identified.
Singapore 	Testing administered per specific case definition that included symptoms and travel exposure.	Intense contact tracing of contacts who were within 6.6 feet of a case for more than 30 minutes.	Border control and community education about social distancing but schools were not closed.
South Korea 	Extensive testing; performing 20,000 tests daily by mid-March reported after this article was published. Legal public health order for home isolation.	Multiple modalities used to identify cases and track and monitor contacts. Legal public health order for quarantine.	Early actions of official social distancing campaigns by city, province, and country. Public access to government data also allowed apps to be created that alerted people if they were near area recently visited by someone who tested positive. Threat declarations in Daegu allowed restrictions of transportation, events, city lockdowns, and school closures.
Lessons for the U.S. 	Expanded testing and rapid results could help decrease chances of transmission if cases are isolated.	Resources should be deployed to increase contact tracing and quarantine contacts, especially those at high risk.	Social distancing can reduce the spread of the virus in concert with increased testing and contact tracing. The U.S. may have unique challenges in mandating social distancing guidelines.