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Contact tracing: China's health code offers some lessons

As debates weigh public safety against privacy, the discussion can draw on China's experience in balancing accuracy of contact tracing with privacy protection. **BY LIN ZHU AND ALFRED M WU**

EVEN as the still-evolving Covid-19 situation looks to have peaked in many parts of the world, contact tracing remains crucially important to prevent further outbreaks by tracking and stopping the chains of transmission.

The debates mostly surround the balance between public safety and privacy. However, the discussion could move beyond privacy concerns, drawing on the experience in China where mobile apps have been developed to balance among the efficiency and accuracy of contact tracing and privacy protection.

Singapore has rolled out various digital platforms and solutions in response to the pandemic, of which TraceTogether and SafeEntry are two key tools. TraceTogether is a mobile app used for individuals' contact recording via Bluetooth in the phone, while SafeEntry is a check-in system to record one's visits to public places such as supermarkets and restaurants. A wearable device for contact tracing has also been distributed to the country's vulnerable seniors.

However, TraceTogether has had a relatively low adoption rate in Singapore, even as some quarters had called for its use to be made mandatory in the fight against the pandemic. Debates around China's health code – introduced four months ago – could shed light on the issue and help inform Singapore's Covid-19 strategy, while keeping tabs on data protection.

China's health code app: a combination of TraceTogether and SafeEntry functions

First launched on Feb 9, 2020 as a pilot in Shenzhen and Hangzhou, China's health code can be seen as a combination of TraceTogether and SafeEntry. It mainly uses citizens' health particulars for public venue entry, similar to SafeEntry. How it works is based on individuals' travel history as recorded in the smartphone, like how TraceTogether functions.

For public venue entry, after one fills in personal particulars (name, identity number, phone number) and "applies for" the health code, the app will generate one of three colours (green, yellow, red) that denote one's risk status. Green allows one to travel fairly freely. A yellow code indicates that the holder should be in home isolation, and red says the user is a confirmed Covid-19 patient and should be in quarantine. People may enter various places such as residential estates and workplaces only when their health code is green.

The authorities have not explained how the health code is generated; many believe that the government is able to obtain data and information

of where one has been even without their necessarily turning on Bluetooth on their phones.

Instead, the country's biggest telecom operators, such as China Telecom and China Mobile, share one's location data with the app to generate the person's risk level colours. So as long as one has a phone, his location data can be collected and shared. According to tech experts in China, the location data on the phone provides information not just the user's physical location down to street level (which would be indicative of the place's epidemic risks) but also the duration of time spent there and also the health status of close contacts.

The Hangzhou health code initiative has since been replicated and extended to other cities and regions across the country.

Efficiency and accuracy of China's health code

Compared to SafeEntry, China's health code has two main advantages:

- **Efficiency**, as the code is embedded within the Alipay and WeChat apps: Unlike SafeEntry, which opens up a webpage on the mobile device, the health code appears as a native app on the phone. This makes it more convenient to use, because opening a mobile app is much faster than loading a webpage on the mobile device.

- **Complete information both real-time and past**: The health code acts as a de facto digital health ID, reflecting both one's travel history and real-time location. This way, any risks posed by possible asymptomatic virus carriers can be managed, which is the government's ex-ante action towards eliminating any potential Covid-19 transmission.

Compared to TraceTogether, China's health code has one main advantage: a high adoption rate. The health code is now used by more than one billion Chinese among the 1.4 billion population and covers most cities and many rural areas.

This can be attributed to two main reasons: Firstly, it is the main tool via which one gains entry to public venues. The fact that the code is installed in Alipay and WeChat, the two biggest mobile apps used in China, helps greatly. Secondly, the health code is easy to learn and use. With one click, the coloured health code can be showed and scanned automatically. It works well with both Android and iOS systems.

Indeed, most people in China now prefer using the health code to other entry tools such as a paper pass. Most complaints about TraceTogether in Singapore have been around problems in using it, including the fact that it does not work very well in iPhones.

Privacy issues of the health code

China's use of the health code system to manage people's movement control and overall its fight against the coronavirus has drawn different responses globally. Many commentaries see it as mass surveillance, another upgraded tool of social control of Chinese citizens, and argue about the loss of privacy. For example, a March 1 *New York Times* report on the code, headlined "In Coronavirus Fight, China Gives Citizens a Colour Code, With Red Flags", stated: "It also appears to share information with the police, setting a template for new forms of automated social control that could persist long after the epidemic subsides."

Readers' comments on that NYT report are interesting, reflecting different attitudes towards the tool. For example, one comment with one of the highest likes, apparently from Singapore, supported the health code: "(The NYT article is) probably true but a very American way of viewing the world. Privacy is a very different concept in Asia; trading safety/security over what little privacy we have is likely much more acceptable to us. While the concerns could be valid, it is a very Westernised view of the world."

Others left comments such as "I will give credit to all the methods that work for controlling the spreading of virus. In fact, I believe some states of China are safer than Korea, Japan, Italy and the US with the help of these methods. Only those cats which can catch mice are good cats."

What would Singaporeans think about a tracing tool like the health code? We do not anticipate the Singapore government adopting the Chinese health code system. Nevertheless, some of its elements could be worth looking at. We propose picking up on the efficiency and accuracy from China's health code by merging TraceTogether and SafeEntry, and meanwhile keeping our original strategy of privacy protection.

Merging TraceTogether and SafeEntry

Merging TraceTogether and SafeEntry can improve the accuracy and efficiency of contact tracing. Making the merged tool an app can accelerate the scanning speed of entry to public venues. And in providing both travel history and real-time status, it can offer ex-ante protection for residents. The SafeEntry feature would spur more people to download the app as they would need to use it to enter public venues – and at the same time they would use TraceTogether, since it's combined within the same app.

Improving the original app by merging two platforms is also more cost-saving and more convenient than developing and giving out wearable devices.

While learning from the health code, we would also pay heed to the controversy around privacy issues. So perhaps, unlike the health code which records an individual's data from telecom operators and share the location without their awareness nor consent, Singapore's merged app can keep its original privacy protection strategy to use Bluetooth signals so that people can choose to record their location or not, and the data will only be collected by the government when one is confirmed to have contracted Covid-19.

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