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COVID-19 Tracking in China

After COVID-19 was declared a pandemic, governments across the world sought to monitor and help prevent the spread of the virus using digital tools. An early example of such a tool was an enterprise resumption app, developed by a tech company in the Alibaba Group and launched in China in February 2020. As of 2022, smartphone 'Health Kit' apps are at the core of China's effort to achieve 'zero-COVID'. In major Chinese cities, residents must submit to frequent testing and go through checkpoints to gain entry to their workplace, residential compound or campus. The new apps enable unprecedented monitoring and surveillance.

Brief Points

- Smartphone applications serve as an increasingly important tool for the Chinese government's public health monitoring and surveillance.

- New electronic tracking tools deployed in the implementation of China's 'zero-COVID' policy demonstrate that China is capable of mass electronic surveillance of its citizens.

- Courtesy of a mobile phone app that collects data, including the owner's current and previous locations, a pop-up alert can effectively 'ground' a Chinese citizen in their own home.

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COVID-19 Tracking by Smartphone

After the World Health Organization declared that COVID-19 is a pandemic, governments across the world sought to halt the spread of the virus with the help of digital tools, especially those that could track COVID-19 patients and their contacts. China was at the forefront of this health surveillance 'revolution'.

China's first COVID-19 tracking app, developed by Alibaba Group's DingTalk, was commissioned by the Electronic Government Affairs Office of the State Council of China as a part of the national, integrated government service platform's epidemic prevention and control response. The enterprise resumption app was serviced by Alipay, Alibaba's digital wallet, and hosted on the Alibaba Cloud (Zhejiang Online 2020). According to Alipay (2020), the goal of the pilot project was to 'accelerate the development of a unified national epidemic prevention and control health code based on the national integrated government service platform'. The pilot-test of the system began on 11 February 2020, even before the WHO declaration, in Hangzhou, the capital city of Zhejiang province in eastern China. The app was introduced across China in a matter of weeks (Kaufmann et al. 2021).

The DingTalk app sent Chinese workers COVID-19 alerts on their mobile phones using a three-color scheme. If a green code appeared on their mobile devices, workers were allowed to resume work. A red code on the app signalled that they were required to stay at home. A yellow code indicated that they were to follow other regulations. According to the *Zhejiang Online* newspaper (Zhang 2020), the DingTalk app was downloaded ten million times on the first day it was launched. Describing the usefulness of the app, the paper reported, 'On the one hand, [the app] can ensure that people in densely populated public areas meet the requirements of public health and safety; on the other hand, if an epidemic emerges, companies can quickly warn of exposure to the source of infection. Relevant personnel can conduct emergency measures' (Zhang 2020).

As a representative of Alipay explained, a company that uses the app can monitor the health of their employees in real time. Authorities can also assess and thus lower the company's risk of resuming operations, as employees identified

as healthy would be allowed to return to work whereas those at risk of infection would be required to stay at home (Zhang 2020).

DingTalk also developed digital learning solutions for schools during the pandemic. In January 2020, when China postponed the start of the new school semester, DingTalk launched an Online Classroom initiative, offering free distance-learning tools, such as livestreaming and online testing and grading. According to its CEO, Chen Hang, DingTalk was the market leader in China among enterprise chat apps. The app offers users 'secure one-on-one and group chats, as well as audio and video conferencing, data storage and integration with clients' internal email system [and] smart hardware for the workplace, such as face-recognition attendance devices' (Chou 2020). DingTalk has customers on several continents. Its Data Protection Office is based in Hangzhou, Zhejiang, but DingTalk's privacy policy[1] is available in English, with addenda for EEA residents, Japan, California and Australia.

Alibaba's applications are making headway in the global market, but the company is not alone in the Chinese pandemic-tracking market. In April 2020, Beijing health authorities introduced their first COVID-19 tracking app to the city's residents and made it available on both Alipay and WeChat platforms. With integrated features such as electronic payment, instant messaging and social media, these platforms are virtually indispensable in the everyday life of Chinese citizens. WeChat is China's 'super-app', integrating social media, online payment options and messaging and calling functions, allowing users to chat, pay bills, pay in shops, send money, buy and sell online, order food, count daily footsteps and share pictures and status updates.

Tencent, one of China's largest technology companies, developed and owns WeChat. Within WeChat there are 'mini programs' that have the same function as apps, although they are integrated with the WeChat 'mother-app'. Like other online service providers based in China, Tencent is obliged by Chinese law to share data with the Central Government of the People's Republic of China (PRC) on request. In other words, all data generated by Tencent is available to central government agencies as a matter of course.

Ample evidence exists of WeChat monitoring and censoring content in chats and posts (Ruan et al. 2021). WeChat users are subject to the WeChat privacy policy,[2] which states that Tencent will only collect personal information upon explicit approval. Indeed, when opening an application, a new user is requested to approve the collection and sharing of personal data. However, the user cannot activate the app if they decline this request. Moreover, individuals need the Health Kit in order to move around in major cities.

As WeChat and Alipay are used for everything from payments to instant messaging, the platform collects users' precise location at any point in time as well as extensive personal data of those who register for the COVID-19 tracking 'service'. In practice, this vast amount of readily identifiable personal data, generated by devices that are ubiquitous in Chinese daily life, is processed and used without the knowledge of those who are tracked and traced.

The 'Zero-COVID' Policy

In spring 2022, when the pandemic policies of most countries shifted from 'stopping the virus' to 'learning to live with it', China declared a 'war on COVID-19'. In March 2022, the Chinese government announced a plan to pursue the virus until it was eradicated from Chinese territory. Although there was never a large risk of contracting COVID-19 in China's capital Beijing, the number of cases[3] (i.e. positive test results) peaked in the city just before the 'zero-COVID' policy was introduced (Sobhan 2022). This may have sparked the central government's decision to launch a scheme to actively track and trace citizens, with a focus on major cities such as Beijing and Shanghai.

With the launch of the 'zero-COVID' policy, smartphone apps gained new significance for China's public health surveillance. In Beijing, every resident must register for the Beijing Health Kit app, which links test results to a national ID or passport number. The Health Kit app collects geolocated information about a Beijing resident, along with the individual's gender, age, place of birth, address and nationality. Since the introduction of Health Kit apps in 2020, every public park, mall, supermarket, office building, railway station, taxi stand, hospital or school has a physical checkpoint at the entrance where the Health Kit apps of those

Photo: Vicky Ackx

wishing to enter are scanned to check their health status. Most residential compounds also have checkpoints where tenants must scan a QR code to enter. The procedure is the same for everyone. A person uses their mobile device to scan a poster with a QR code. The phone then displays the person's health status. This includes the number of days since their latest Nucleic Acid Test, their vaccination status, their full name and ID number. The display also includes a picture of the person surrounded by colored, moving dots. If the dots are green, the user is free to go. If yellow, the person has been in contact with a registered 'case' of COVID-19 or has visited an area with a confirmed case; the person is barred from entering any public place and must isolate for as long as the current rule requires. Red signifies that a person has tested positive for COVID-19. The person is then immediately brought to a hospital, regardless of the person's age or the severity or absence of symptoms. A positive test requires a hospital stay in total isolation until three negative tests are returned.

When a positive case is detected, all individuals who have been in close proximity to the new 'case' are notified by a pop-up on their Health Kit app, which also turns yellow. The new 'case' is located by health authorities and quarantined.

Because a Beijing resident must scan a QR code to enter any public or semi-public space,

Beijing's Big Data Center can find out exactly where every resident is at any given time.

The data collected by the geolocation feature of the tracking apps provides authorities with a list of all people who have been in close contact with someone who tested positive for COVID-19. These people are either ordered to stay at home or transported, usually within hours, to a designated quarantine facility on the assumption that the risk of these people being infected with COVID-19 is fairly high.

The first screening for contacts is based on information provided by the person who tested positive. These contacts are typically other household members, the person's friends and workers in shops they may have visited or taxi-drivers who drove them somewhere.

A second screening draws on the patient's app data to identify other app users who were in the vicinity of the COVID-19 patient—whether in a supermarket or office building or on a train—when the positive result was recorded. If the 'COVID-19-positive' individual is still in a public place when the test result arrives, the place is sealed off, with no one permitted to leave until they have been tested and produced a negative result. Those with negative results must go directly home, isolate for seven days and make themselves available for repeated testing. The sudden closure of public spaces—a shopping

mall, a supermarket, a campus, an office building—has become a frequent disruption to everyday life in urban China. Anyone in a space subject to closure receives a pop-up alert on the Health Kit app on their mobile device.

A third screening draws on Health Kit tracking data gathered in the past 14 days. The app is thus essential not only to alert users who are in the same area as the COVID-positive person when that person tested positive, but also to detect users who may have been in contact with the person prior to testing but when they were infectious. These users must get tested and isolate for a required period.

Daily press-conferences provide information on new cases discovered in a particular area. Details are also spread online, including a COVID-positive person's itinerary, such as where they ate or shopped, on the day they tested positive.

Earlier in the pandemic, Beijing residents were requested to report to community health staff if they had visited the same area as a COVID-positive person. In 2022, the app-generated data triggers automatic notification to users who have been in the same area as a new 'case'. This pop-up alert prevents those who receive it from entering any monitored location, effectively making them stay at home for seven days. They must also produce negative COVID-19 test results for three consecutive days.

If an alerted user has not been in a mid- or high-risk area and can prove that the alert is a false alarm, then that person can call a local community center and appeal to the staff, who will decide whether to change the user's status manually or reject the appeal.

WeChat users are identified as visitors to a mid- or high-risk area through their WeChat payment history and geolocated chat histories, as well as through the mobile phone tracking feature of the Health Kit app itself. If the WeChat user is travelling outside of Beijing when the pop-up alert appears, the user is prevented from boarding a return flight or train to Beijing and from crossing the Beijing border by car until the user has spent seven days in a no-risk area—that is, a city where no COVID-19 cases have been registered in the past fourteen days. Hundreds of thousands of travelers have been prevented from returning to their homes by such pop-up notifications.

The Travel App

While China's central government issued the 'zero-COVID' policy, it is local governments that must execute the policy. This includes launching their own Health Kit application, collecting and processing residents' personal health data and making that data accessible to national authorities.

Travelers must enable tracking of their movements across administrative boundaries by downloading another mini program, officially called the 'Communication Big Data Travel Card' but also known as the Green Arrow app. Whenever a traveler wants to check in for a flight or train, cross a border in a vehicle or check into a hotel, they must scan a code and display the Green Arrow app on their smartphone screen at checkpoints. The app's main function is to register every location a user has visited in the past seven days.

To activate the app, the user simply enters their phone number. The app then collects all data linked to that number from WeChat payments, check-in scans and mobile phone signals sent between the user's phone and cell phone towers in the past seven days.

The Green Arrow app is a very efficient tool to check people's travel history. This was exemplified at the start of the Autumn 2022 semester in Beijing. Students were required to remain in Beijing for seven days before they were admitted back on campus. Whether or not students had obeyed this mandate was easily verified by checking the Green Arrow status of their mobile phones. If any location other than 'Beijing' appeared, the student was barred from entering the campus.

Unprecedented Surveillance

Although the vast majority of Chinese citizens living in rural or less densely populated areas are not required to use a tracking app, those in major cities such as Beijing and Shanghai have been greatly affected by the 'zero-COVID' policy. Residents of these cities are under unprecedented surveillance, subjected to frequent mandatory testing and required to show a 'green' status on their mobile device to gain access to any public space or public service.

In major cities, residents who want to move around must use Health Kit apps. Should their test or that of their minor children be positive for COVID-19, they will immediately hear from authorities, and quickly be picked up and transported to a quarantine facility or hospital, where they must stay until they test negative on three consecutive days.

Massive resources are spent tracking down anyone with a positive COVID test result, without regard for the social and individual costs. Given the Chinese government's access to Big Data derived from stringent COVID-19 testing and mandated checkpoints at every entrance, residents of China effectively live under heavy surveillance. Smartphone apps are at the core of China's 'zero-COVID' response. ∎

Notes

1. See: page.dingtalk.com/wow/dingtalk/act/privacy-en-lite?wh_biz=tm.

2. See: weixin.qq.com/cgi-bin/readtemplate?lang=en_US&t=weixin_agreement&s=privacy&cc=CN.

3. See: www.nytimes.com/interactive/2021/world/china-covid-cases.html.

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