**The second wave of COVID-19 in a tourist hotspot in Vietnam**

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# Running head: Second wave of COVID-19 in Vietnam

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# Highlights

The second wave of COVID-19 in Vietnam started in the largest tourist city in the country (Da Nang), initially with nosocomial transmission which spilled over and resulted in widespread community transmission. We discuss the challenges and strategies to prevent a further nationwide outbreak.

**Keywords**: SARS-CoV-2, second wave, nosocomial transmission, community transmission, Asia; travel; non-pharmaceutical interventions

By 8 September 2020, Vietnam reported a total of 1049 laboratory confirmation of SARS-CoV- 2, with 35 deaths. After successfully containing the first wave 1 followed by 99 days without any further local cases, the second wave of COVID-19 started on July 25 in a major hospital in Da Nang – the biggest tourist city in the country with more than one million local citizens and about eight million tourists annually. During the period from July 25 to August 1, new incident cases increased by about 30% after only one week, the fastest growing rate since the beginning of the epidemic.

There was a total of 551 cases related to the outbreak in Da Nang, as reported by September 8th; 58.8% female, median age was 46 years, and 26.1% were aged ≥ 60. About half of all SARS- CoV-2 cases were found in the hospital setting (49.4%), with Da Nang Hospital (DNH) as the epicenter of the outbreak (251 cases, 45.6%). Among cases detected in hospitals, there were

9.9% health-care workers (HCWs), 44.9% patients, 34.9% family caregivers, and 10.3% persons who had visited the hospital. There were 279 cases detected in the community, 175 were investigated as close contacts of positive cases (62.7%), and 104 cases did not identify the source of transmission (Table S1). A total of 15 major cities/provinces reported cases linked to the Da Nang outbreak, with most of cases detected in Da Nang (71.0%), followed by Quang Nam (16.9%), Hai Duong (2.9%), Hanoi (1.8%), and Ho Chi Minh City (1.5%). Our observations emphasize the potential threat of unrecognized rapid community spread even in successful outbreak-controlled countries such as Vietnam or New Zealand, and the importance of prevention of nosocomial infections in hospitals. Rigorous infection prevention control (IPC) measures should be continued in medical settings until a vaccine is rolled out.

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# Responses of Vietnam to the second wave of COVID-19

In Vietnam, a large nosocomial outbreak previously occurred in March at the biggest hospital in the North – Bach Mai Hospital (BMH). The successful experience from the BMH outbreak was a valuable lesson of how to prevent further community transmission from a nosocomial outbreak through mass testing of all suspected cases, lockdown, vigorous contact tracing, quarantine all the possibly contacts, and social distancing.2 In Da Nang, one day after the first case was detected, three hospitals in a medical complex area with the center was DNH were put under lockdown. A total of 6,018 persons were considered as suspected cases and put in quarantine, including HCWs, non-clinical staff, patients, and family caregivers. An addition of 6,665 persons traced as direct contacts of positive cases were also quarantined and tested as reported on July

30. The laboratory capacity for RT-PCR of SARS-CoV-2 in Da Nang was increased to about 10,000 samples per day supported by BMH and the Ho Chi Minh City Pasteur Institute. In early August, mass testing was expanded to nearby residential areas of the hospital complex, and other high-risk areas in the community. From July 25th to September 2nd, an estimated 228,000 people were tested in Da Nang (about 25% of the total population). On 3rd September, the city planned to extend the testing for 71,424 low-risk households, one sample for each household. Social distancing was applied on July 28 for the whole city when all non-local citizen returned to their home province (Figure 1). Hundreds of experienced HCWs from Hanoi and Ho Chi Minh City were sent to Da Nang to support the control efforts, similarly to what China did for Wuhan.3. A temporary hospital for care and treatment for suspected cases and mild cases of COVID-19 was

built, following the concept of Fangcang Hospitals in China,4 in addition to two designated hospitals that were rapidly established and put under the directly direction of a special committee from the Ministry of Health (MoH).

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The second wave occurred after more than 3 months of no detection of local cases in Vietnam, when the intra-country prevention measures had been eased, including the lifting of national social distancing in April, reopening of entertainment activities, and stimulation of domestic tourism. From July 1 to July 27, it was estimated that more than 1.5 million people returned from Da Nang to other provinces of Vietnam, of which about 41,000 people had visited DNH. The containment strategy varied between provinces, depending on the local laboratory capacity and ability to do contact tracing. Community measures similar to those in rural areas of China5 were employed for rural areas in Vietnam. Hanoi is the capital city with the largest number of contacts, hence mass testing mass testing was done for about 100,000 persons using the rapid antibody test, with strict quarantine and mobility restrictions. The control approach in Hanoi was almost similar to the contain strategy in South Korea.6 However, several studies indicated that the rapid tests had low sensitivity at early stage or for those with asymptomatic infections.7,8 False negative result might create a sense of false reassurance among both suspected cases and HCWs. This strategy quickly revealed its limitations when two cases who had negative test result based on the rapid test were soon found to be positive by RT-PCR, which resulted in mass re- testing for all the contacts and suspect cases with the RT-PCR methods in Hanoi.

Other provinces with lower number of tracing contacts, carried out less aggressive approach, but still followed the general principle of vigorous tracing, isolating, and testing if symptomatic. For example, Ho Chi Minh City, the biggest metropolitan city in South Vietnam received about 52,449 people returning from Da Nang. Consequently, Ho Chi Minh City conducted contacts tracing of all persons from Da Nang and stratified them into three groups. People with respiratory symptoms or those exposed to the three epicenter hospitals in Da Nang were placed in centralized quarantined and tested for SARS-CoV-2; other cases were isolated and monitored at home by local commune health staff.

In addition, a mobile application, named “Blue-zone” was developed and made freely available to all residents in Vietnam. By August 20, the application had exceeded 20 million downloads.

# Current challenges and future directions

One of the biggest challenges of the outbreak in Da Nang was the high disease burden in the elderly with comorbidities as a consequence of the widespread of nosocomial transmission among patients at DNH. The proportion of severe or critical cases was above 10%, which was significantly higher than during the first wave where only five cases (1.2%) required ventilation or extracorporeal membrane oxygenation (ECMO). There were 35 deaths, mostly among patients aged ≥ 60 years, and those with serious underlying medical problems such as end-stage kidney diseases, diabetes, cardiovascular diseases, or cancer, in line with published data from the UK.9

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The second challenge was the asynchronous capacity across provinces for quarantine, contact tracing and testing. Recent studies indicate a moderate level of local capacity to deal with the epidemic response, especially in rural areas and southern region.10 Mobilization of resources to localities with poor health system was critical for contact tracing and managing of more than 1.5 million people linked to the Da Nang outbreak.

# The Politics of Health Code

At the heart of the rising Health Code is the role of digital platforms. Platforms are important actors in economic and social interactions (van Dijck et al., 2018). They facilitate multisided markets and expand their services into the web (Helmond, 2015; Nieborg & Poell, 2018). In my view, digital platforms are key sociotechnical constructs mediating state– citizen relations and rendering citizens to a state of perma- nent visibility. In what follows, I will discuss three actors involved in Health Code: governments, digital platforms, and end users (i.e., citizens).

First and foremost, Health Code is an example of China’s recent investment in the platform ecosystem. While Health Code is installed on two commercial platforms, the underly- ing assumption is that governments allow tech giants to har- ness massive data sources. In fact, local governments have released guiding opinions and regulations to promote and normalize the use of Health Code, while Alipay and WeChat can share data with local police (Mozur et al., 2020). The State Administration for Market Regulation has issued national standards for the adoption of Health Code. Hence, state actors have become vital developers and partners of digital platforms. My previous research on China’s Social Credit System has revealed that the Chinese government is dependent upon platforms for credit assessment, suggesting the expanded cooperation between state power and private actors (Liang et al., 2018). The case of Health Code further indicates that governments and tech giants have achieved unprecedented collaborations for tracking individuals.

Second, digital platforms are pivotal gatekeepers in the data flows (Helmond, 2015). Indeed, Alipay and WeChat have penetrated deeply into the Chinese platform ecosystem and created institutional dependencies; thus, end users, advertisers, and complementors are becoming dependent upon these two platforms. The platformization of Alipay and WeChat has expanded their data collection to track and predict an ever-wider variety of users’ activities. At the same time, governments rely heavily on platforms to gather data and connect with citizens. My recent research finds that tech giant Alibaba is contributing to big data policing in China by offering technical support and data sources. Compared to the US-based platforms, Chinese platforms are important actors distributing public services and engineering power relations. For example, Alipay and WeChat provide elec- tronic ID for individual users, so people can access govern- ment services without traditional state-issued ID cards. Thus, Health Code shows that Alipay and WeChat can medi- ate state–citizen relations by capturing personal data for public health surveillance.

Finally, we need to think about the datafication of indi- viduals. Big data and computational revolutions have sub- stantially promoted surveillance and social sorting (Cheney-Lippold, 2018). The proliferation of the sharing economy seizes the opportunity to constantly classify indi- viduals. Recently, China deploys an official platform (i.e., *Xuexi Qiangguo*) to rate and rank citizens based on multi- ple metrics, including how many news articles people read and how many correct answers they provide in quizzes. Users receive study points and national rankings, further quantifying their political knowledge and loyalty. Health Code can be considered as a rating and ranking practice aiming to render citizens to a state of visibility. Consequently, citizens are increasingly becoming visible and governable through the intersection of platform datafi- cation and everyday life.

It is worth noting that Health Code raises concerns about accuracy, privacy, and security. Currently, the system is largely inconsistent at local levels. For instance, a yellow code indicates 7 days quarantine in Hangzhou, while the same color means 14 days in Shandong province. Meanwhile, a green code does not necessarily mean the person is healthy, since several people with green codes tested positive for COVID-19 in Wuhan. More importantly, Health Code poses a threat to data security and reflects tensions between public values and privacy. It is not clear, for instance, who is in control of data flows, who owns user health data, and how Health Code is regulated by governments.

# Author contribution

N.M.V and D.D.C conceived the manuscript and wrote the first draft. All authors contributed to the final manuscript.

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# Conflicts of interest

The authors declare no conflict of interest.

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