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## Commentary

## The resilience of Taiwan's health system to address the COVID-19 pandemic

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A new book by world-leading economists gives clear advice on how to mitigate the COVID-19 pandemic: "Act Fast and Do Whatever It Takes" [1]. Yet, countries that have done so are the exceptions rather than the rule – and one of them is Taiwan. With 446 cases and 7 deaths as 22nd of June 2020 in a population of 23.8 million, Taiwan has remained relatively unscathed so far despite its proximity to the virus epicentre [2]. How was Taiwan able to respond the way it did? Here, we examine Taiwan's response using the World Health Organization (WHO) health system building blocks [3].

The Taiwanese government's response to COVID-19 has been characterised by speed, vigilance and decisiveness. As early as 31st December 2019, when the first reports of a novel virus in China emerged, Taiwan began to screen arrivals from Wuhan, imposing home quarantine on those with fever and or respiratory symptoms. By 20th January 2020, the government activated their Central Epidemic Command Center (CECC), which operated well in combating the outbreak of severe acute respiratory syndrome (SARS) in 2003, to coordinate cross-ministry efforts in handling the new pandemic. On 23rd January, Taiwan was the first country to ban visitors from Wuhan, and this travel ban was progressively extended to other affected countries. From 19th March, Taiwan banned the entry of non-residents and imposed home quarantine on all returning residents [4].

The American experience is a reminder that lack of health insurance for large parts of the population is a major barrier to mounting an effective outbreak response [5]. Taiwan has a single-payer national health insurance (NHI) scheme that covers more than 99% of the

population, and emergency funding has been approved to support COVID-19 prevention efforts and affected industries [6].

Taiwan's hospitals currently have sufficient isolation rooms for confirmed and suspected cases of COVID-19. To minimise cross-infection, hospitals implemented strict triage and entrance control. To control community spread, local governments are responsible for contact tracing, quarantine enforcement and risk assessment in community settings [4].

Since the SARS epidemic, Taiwan commenced a long-term investment in additional capacity at the Centers for Disease Control (CDC), hospitals and infectious disease laboratories. Once China released the genetic sequence of COVID-19, Taiwan CDC's laboratory rapidly developed a test kit and expanded capacity via the national laboratory diagnostic network, engaging 37 laboratories that can perform 3900 tests per day [4]. However, healthcare workers have raised concerns about intensifying workloads, as some struggle between shifts at hospitals, quarantine centres and airport screening stations [7].

The Taiwanese government has secured an adequate and affordable supply of face masks for healthcare workers and citizens. First, the CECC suspended mask exportation and engaged local companies in ramping up production. Next, it introduced a mask rationing system that prioritises allocation to healthcare workers while allowing citizens to buy a capped number of masks per week for NT\$5 (\$0.17) each [4]. However, some healthcare workers have reported a shortage of protective suits, and called for greater transparency on the availability of medical supplies [7].

A crucial component of Taiwan's strategy has been the integration of its NHI database with its immigration database, which allows medical providers to access patients' travel histories and generates real-time alerts to facilitate early detection of cases. Taiwan also enhanced case identification using innovative technology, including Quick Response (QR) code scanning and online reporting of travel history, contact history and health symptoms. Individuals identified as high-risk are subject to 14-day home quarantine with phone monitoring of compliance and health status [8].

The Taiwanese government has prioritised timely and transparent communication with the public. The head of CECC holds daily press conferences reporting on the progress of the pandemic, changes in policies, and clarifying misinformation. Many politicians have also used mass media and social media platforms for public education.

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Public communications are largely made in Mandarin Chinese, although efforts have been made to produce multi-lingual education materials [8]. There are calls for the government to increase transparency by publicising the locations of community-transmitted cases so that citizens can avoid virus hotspots [7].

Leveraging on lessons learned from SARS, Taiwan's government built a robust health system that was well-equipped and well-prepared to handle the COVID-19 outbreak. The SARS experience may also explain the high degree of public adherence to guidance on social distancing and mask wearing. [6] This strong "societal defence mechanism" benefits from a sense that the public is a partner of the government in the fight against COVID-19. Taiwan provides an example of the importance of combining a whole-of-government and whole-of-society approach to a pandemic that infiltrates all aspects of society.

#### Declaration of Competing Interest

Dr. McKee reports expenses from the Taiwan Health Promotion Agency, outside the submitted work. The rest of the authors declare no conflict of interest.

Dr. Chiou reports to serve as the Director-General of Taiwan's Health Promotion Administration 2014–2016, and Director-General of Taiwan's Health Promotion Bureau 2009–2014.

All other authors declare no conflict of interest.

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