

# Taiwan's comprehensive national health insurance system and our experience of fighting the SARS epidemic

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## 1. A comprehensive national health insurance system—the keystone in our response to coronavirus disease 2019 (COVID-19)

1.1. Taiwan's National Health Insurance (NHI) system was implemented in 1995, consolidating the three major insurance systems that had previously been available as separate services to laborers, civil servants, and farmers. The system initially covered only 59 percent of the population; however, following the principles of sustainable development and caring for the vulnerable, the government progressively expanded the system into a nationwide social insurance system that now covers more than 99 percent of the population and provides healthcare services to all citizens. Working within constraints on the availability of medical resources, the government has continued to consult with medical professionals, manufacturers, and the general public to ensure a steady rise in the quality of healthcare services, which have become a keystone in Taiwan's response to the COVID-19 outbreak.

1.2. In 2019, a survey conducted by the Taiwanese government put approval ratings for the NHI system at an all-time high of 89.7 percent. With a score of 78.72, Taiwan also ranked number one in the 2019 Health Care Index published by renowned magazine *CEOWORLD*. Moreover, in February 2020, Numbeo, a global crowd-sourced internet database,

placed Taiwan top of its healthcare index for the fourth consecutive year with a score of 86.71. Citizens are confident in the government's capacity to fight epidemics thanks to the comprehensiveness of our medical system. Indeed, anybody can visit a hospital for tests without hesitation, or fear of being hit by an unaffordable bill.

## **2. Adoption of smart technologies forms the backbone of efforts to fight pandemic**

2.1. The National Health Insurance database, comprising information gathered over the past 20 years, is the largest national database covering individual citizens. In 2003, with safeguards in place to ensure personal information privacy, the government introduced a smart card-based NHI system. And in recent years, the emerging trend of big data analytics has seen medical information being consolidated even further and put online to establish the most extensive database possible, resulting in highly efficient medical resource management and practices.

2.2. A patient-centered system called PharmaCloud was established in 2013. Using the NHI's virtual private network system, PharmaCloud allows medical institutions to view the past three months of a patient's medication history, which has helped improve the quality of hospital visits and reduced unnecessary wastage of medical resources. The government then built upon and expanded the system to create the NHI-MediCloud System in 2015, introducing 12 additional categories of data into the database, including traditional Chinese medicine, detailed surgical records, and vaccination history. The government continued to optimize the management of cloud-based medical information and has now initiated a system called My Health Bank that allows citizens to

access the cloud for themselves. After registering their NHI cards, users can log on the system to check their medical history without having to use a smart card reader. Migrating healthcare information to the cloud helps support citizens in practicing efficient health management.

- 2.3. The smart card-based NHI system and the MediCloud provide a solid technological foundation in the fight against COVID-19, and are serving important functions in disease prevention measures including the distribution of surgical masks, quarantine and isolation, and in checking and verifying patients' medical and travel histories. Requiring that citizens use their NHI cards to purchase face masks has also ensured that masks are distributed in a fair and orderly fashion. This card-based NHI system is also integrated with border control records, which is helping doctors remain alert and make informed diagnoses, and thus providing an even more extensive guard against the spread of disease.

### **3. Experience of fighting the SARS epidemic helping Taiwan strengthen all-round response capacity**

- 3.1. Taiwan confirmed cases of severe acute respiratory syndrome (SARS) in March 2003 after the outbreak started in China earlier that year. However, as Taiwan was unable to participate in the World Health Organization (WHO), its access to information and associated channels was limited, and the government had no choice but to fight the disease alone, thus missing the window of opportunity for containing the virus. Among the 8,096 cases worldwide, 346 were confirmed in Taiwan. After months of fighting the disease, Taiwan was finally removed from WHO's list of SARS-infected areas on July 5.
- 3.2. Remembering the lessons from the SARS epidemic, over the past 17

years Taiwan has taken steps to train, advance, and improve disease prevention and control mechanisms. Laws were passed for the establishment of a Central Epidemic Command Center (CECC), resulting in a whole-of-government approach which has helped us mobilize our response to COVID-19 much more efficiently. Important disease prevention and control measures taken since the SARS outbreak have included:

3.2.1. Establishing the National Health Command Center (NHCC): Following amendments to the Communicable Disease Control Act in 2004, the Bureau of Communicable Disease Control (later restructured and becoming the Centers for Disease Control [Taiwan CDC] in 2013) established the NHCC in 2015 to serve as a unified central command system for disaster prevention. The NHCC provides decision-makers with comprehensive information about disasters as they unfold, as well as associated resources issues. It also coordinates communications among central, regional, and local governments as part of disease prevention and control efforts. Its wide-ranging use of both hardware and software and its efficient channels of communication have established the NHCC as a holistic information platform.

3.2.2. First in the world to enact laws authorizing the creation of a CECC: The Taiwanese government amended the Communicable Disease Control Act in 2004, and, as required in Article 17 of the Act, went on to promulgate the Enforcement Regulations Governing the Central Epidemic Command Center. Under these regulations, the central competent authority, taking into consideration the severity of epidemics at home and abroad, may submit a recommendation to the Executive

Yuan for approval to establish a Central Epidemic Command Center (CECC), and appoint to it a commanding officer. The commanding officer has the authority to implement disease controls through the command, supervision, and coordination of government organizations, public enterprises, reserve components of the armed forces, and NGOs. A CECC was established on January 20, soon after the COVID-19 outbreak occurred. The CECC is in charge of monitoring the pandemic and developing response measures, and also serves as a single point of contact with the public and international community. Taiwan was the first country in the world to establish a command center of this kind in response to COVID-19—even earlier than China.

3.2.3. Establishing an infectious disease prevention network: After the SARS epidemic, the government restructured national disease prevention mechanisms and established an infectious disease prevention network that integrates epidemiological and public health capacity. The network is a three-level command framework that coordinates central, regional, and local institutions. In the event of an epidemic, beds and medical personnel are requisitioned at participating hospitals, supported by stringent policies for nosocomial infection management, patient diversion, and ward segregation. A system for reporting cases of infection is also instantiated. We have also made every effort to build medical capacity by maintaining fully operational negative pressure wards, holding hospital drills and training, and supporting medical professionals, as well as restocking and maintaining reserves of medical supplies such as face masks and protective suits.

3.2.4. Cultivating and establishing disease prevention teams: After the SARS

outbreak, the Taiwanese government actively invested in R&D for technologies designed to fight emerging infectious diseases, as well as training for doctors. Amendments to related laws paved the way for the establishment of disease prevention teams and the recruitment of epidemiologists. Since September 2005, specialists from seven organizations covering such areas as forensic medicine, infectious diseases, pathology, and internal medicine have established the first disease prevention team. Having these professionals engage in real-time, frontline epidemiological work at a domestic level allows Taiwan to quickly identify the reasons for outbreaks of disease and comprehend situations as they develop, and thus more effectively limit further spread of these illnesses.

3.2.5. Building platforms for international cooperation: The government amended the Organizing Act for the Establishment of the Department of Health in 2004 and created the International Cooperation Unit. This has strengthened international information gathering, helped coordinate and promote international cooperation and exchange in matters of public health, and provided the international community with open and transparent information about any outbreaks of disease, allowing us to engage in regional and international cooperation, and fulfill our duty as global citizens. We have also nurtured international public health human resources, strengthening our experience of such affairs while also raising Taiwan's visibility.

#### **4. Learning the lessons of SARS—instigating advanced preparations to fight COVID-19**

4.1. At the end of 2019, the Taiwan CDC learned, through internet sources,

of a number of SARS or SARS-like cases in Wuhan, China. Taiwan's previous experience of fighting SARS meant it was particularly alert to information regarding this new outbreak. Thus, on December 31, authorities emailed WHO's International Health Regulations focal point, calling attention to the occurrence of "atypical pneumonia cases" in Wuhan, pointing out that patients had been isolated for treatment—a circumstance that public health experts know indicates the possibility of human-to-human transmission—and asking WHO to provide further information. Taiwan also immediately instigated advanced preparations, adopting a number of important policies with great effect. Among these, border quarantine measures were implemented on December 31; COVID-19 was formally listed as a category 5 communicable disease on January 15; a travel notice was issued for Wuhan on January 16; and export restrictions for face masks were implemented on January 24. For comparison, SARS was listed as a communicable disease one and a half months after its discovery, and to stabilize domestic supplies, export restrictions for face masks were only implemented after more than one month.

- 4.2. The SARS outbreak shows that China has prior form when it comes to suppressing information and delaying reporting. At that time, Vice President Chen Chien-jen was Minister of Health; and indeed, many doctors and public health officials in leadership positions on today's front line lived and worked through the outbreak, and remember the experience vividly. At the instruction of Vice Premier Chen Chi-mai, the Taiwan CDC sent a letter to the PRC National Health Commission on January 6 stating that in accordance with the Cross-Strait Cooperation

Agreement on Medicine and Public Health Affairs, Taiwan was willing to send experts to Wuhan to appraise the situation. Having received a reply from the PRC government on the evening of January 12, Taiwan dispatched a team of two experts to visit Wuhan, where they sought to understand the latest developments regarding the outbreak, associated prevention and containment measures being implemented, and patients' history of exposure and contact. Given that first Thailand and then Japan reported confirmed COVID-19 cases, Taiwan's experts considered the possibility and risk of limited human-to-human transmission, and of unidentified sources of infection for the epidemic. Therefore, on January 16, a day after the experts returned to Taiwan, the CDC raised its travel notice for Wuhan to Level 2: Alert, strengthening early warning and instituting stronger safeguards related to travel to and from Wuhan.

