



Short Communication

COVID-19 preventive measures showing an unintended decline in infectious diseases in Taiwan

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ABSTRACT

Most of the communicable diseases have contact, airborne and/or droplet mode of transmission. Following the outbreak of COVID-19, the Taiwan government implemented the use of masks and sanitizer, as well as other preventive measures like social distancing for prevention. This public response likely contributed significantly to the decline in the outbreak of other infectious diseases.

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The public health response to the threat of novel coronavirus disease 2019 (COVID-19) may have diminished the effect of the 2020 influenza season in Japan and Singapore (Sakamoto et al., 2020; Soo et al., 2020). The Taiwan government and society also responded swiftly to the outbreak of COVID-19 (Guan et al., 2020), implementing systemic precautions and disseminating knowledge on prevention to the public (Wang et al., 2020). The Central Epidemic Command Center (CECC) in Taiwan managed the outbreak of COVID-19 effectively. From 12 April to 1 June 2020, there were no positive local cases reported, bringing it to 50 consecutive days of no local transmission in Taiwan. As of 1 June 2020, the total number of cases in Taiwan has been retained at 443. Since the outbreak began, Taiwan has conducted 72 319 COVID-19 tests, of which 71 287 were negative. Out of the total 443 confirmed cases, 352 were imported, 55 were local, and 36 came from the Navy's 'Goodwill Fleet' (Everington, 2020).

According to the Taiwan Centers for Disease Control (CDC) website, influenza virus infects hundreds of thousands of people annually in Taiwan (Jian et al., 2017). Previous studies have shown that the public is likely to utilize face masks when they perceive themselves as susceptible and the pandemic threat as severe (Sim

et al., 2014). The use of face masks and hand sanitizer, a ban on social events, and working from home, etc., were among the measures that were followed to curb the spread of COVID-19. Taiwanese people panic-bought nearly all available mask and hand sanitizer stocks within 2 weeks of the first case in Taiwan (21 January 2020). Movie theatres, restaurants, and malls had diminishing crowds. This proactive change in behavior may have induced surprising benefits: severe complicated influenza (for details see Supplementary material) and invasive pneumococcal disease (IPD) cases declined sharply in February through May (Figure 1).

The recent COVID-19 outbreak has stimulated a public-driven movement for prevention. Google searches for the terms "face mask" and "hand sanitizer" spiked approximately 100-fold in Taiwan following the first COVID-19 case, resulting in a shortage of masks and leading to government investment in the production, rationing, and distribution of masks (Figure 1) post week 5 since 1 January 2020. During the following months, severe complicated influenza and IPD cases declined as compared to the 6-year averages. What started as a higher than average severe complicated influenza season dropped to a 6-year low, with rates during the spring months approximately 10% of the 10-year average. These differences may have been due to an earlier than average occurrence of the influenza season, but the absolute baseline was significantly lower than that observed previously. Another interesting observation was that the incidence rates were not only lower, but also reached a persistent zero level for a continuous period of 3 months, which has never been seen before. IPD

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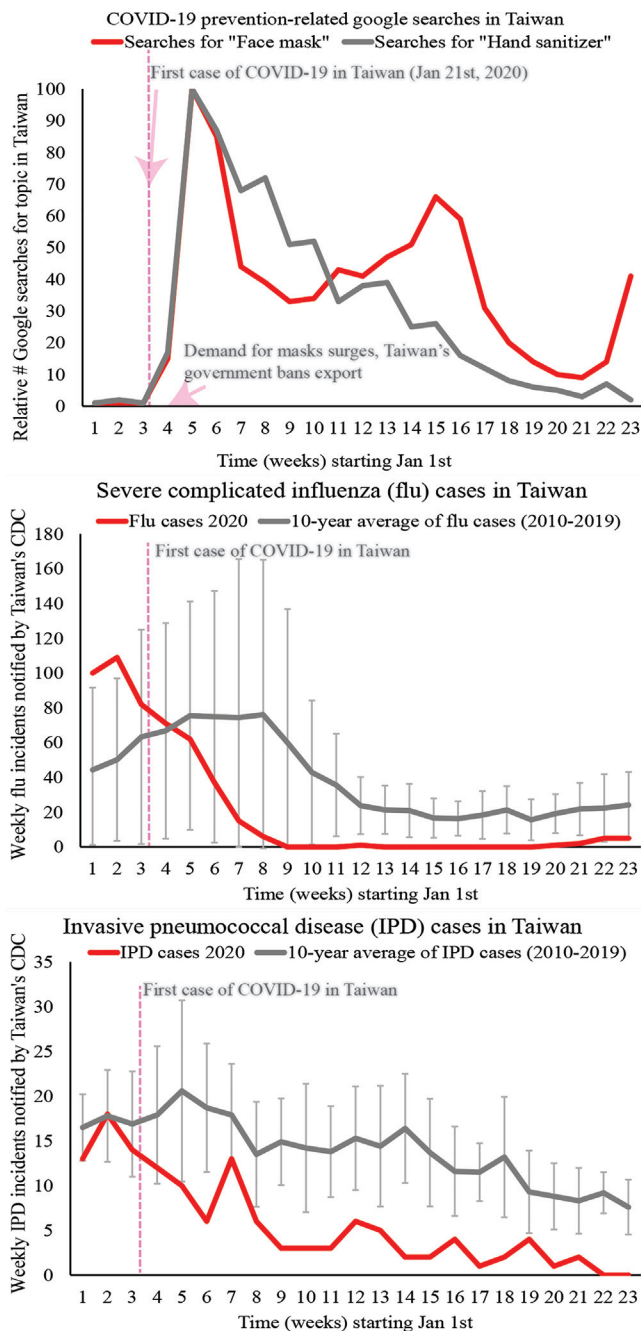


Figure 1. Relationship between public awareness of COVID-19 prevention and communicable disease incidence tracked in real-time. Infectious disease rates were provided by the notification system of the Centers for Disease Control of Taiwan (Taiwan's CDC). For a conservative estimate of the decrease in communicable diseases seen this year, pending cases were included with confirmed cases in the incidence presented. Weekly averages are reported with standard errors from the mean. We chose Google searches for the mandarin Chinese translation of "face masks" (口罩) and "hand sanitizer" (乾洗手) as our indicators of public interest in COVID-19 prevention behaviors. Search data for individual days was provided in relative units (out of 100 maximum).

diagnoses have also reached record lows (over two standard deviations below the 10-year mean). Due to zero new COVID-19 cases for a continued duration, the government retracted mask rationing after week 21, which led to a further increase in Google searches for "face mask" for online shopping.

Throughout spring 2020, in a public-led prevention effort, nearly every medical facility, museum, shopping mall, and popular

restaurant in the major cities of Taiwan required temperature checks and ethanol hand washes before entry. Since many communicable diseases have contact, airborne, and/or droplet transmission, we assume that the use of masks and sanitizer, along with other COVID-19 prevention measures such as social distancing, may have contributed significantly to the observed decline in severe complicated influenza and IPD cases. There could be multiple factors contributing to the lower incidence rates of complex influenza and pneumococcal disease. It could be because of a low intensity of the disease this year, higher vaccination rates, lower utilization of hospitals, and, we assume, a proactive public response for preventive measures.

As society reels from the financial, societal, and health costs of severe COVID-19 response measures globally, we invite interdisciplinary researchers and policy-makers globally to investigate and facilitate the correct level of prevention for future epidemics, including seasonal influenza. Would we want to, and would it be possible for the public to largely reduce infectious diseases including seasonal influenza through the use of face masks and hand sanitizer? So far, these measures are seemingly useful. Regardless, we urge the general public to actively participate in preventative measures because they may both contain COVID-19 and reduce the overall burden of communicable diseases.

Authors' contributions

Concept and design: Cooper J. Galvin, Shabbir Syed-Abdul; literature search: Cooper J. Galvin, Shwetambara Malwade; writing and figures: Cooper J. Galvin, Yu-Chuan (Jack) Li; final proof-reading and editing: Cooper J. Galvin, Yu-Chuan (Jack) Li, Shwetambara Malwade.

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Ethical approval

Approval was not required.

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Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.ijid.2020.06.062>.

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