

COVID-19 control in China during mass population movements at New Year



The outbreak of novel coronavirus disease 2019 (COVID-19) continues to spread rapidly in China.¹ The Chinese Lunar New Year holiday, the start of which coincided with the emergence of COVID-19, is the most celebratory time of the year in China, during which a massive human migration takes place as individuals travel back to their hometowns. People in China are estimated to make close to 3 billion trips over the 40-day travel period, or Chunyun, of the Lunar New Year holiday.² About 5 million people left Wuhan,³ the capital city of Hubei province and epicentre of the COVID-19 epidemic, before the start of the travel ban on Jan 23, 2020. About a third of those individuals travelled to locations outside of Hubei province.⁴ Limiting the social contacts of these individuals was crucial for COVID-19 control, because patients with no or mild symptoms can spread the virus.⁵

Government policies enacted during the Chinese Lunar New Year holiday are likely to have helped reduce the spread of the virus by decreasing contact and increasing physical distance between those who have COVID-19 and those who do not. As part of these social distancing policies, the Chinese Government encouraged people to stay at home; discouraged mass gatherings; cancelled or postponed large public events; and closed schools, universities, government offices, libraries, museums, and factories.^{6–10} Only limited segments of urban public transport systems remained operational and all cross-province bus routes were taken out of service. As a result of these policies and public information and education campaigns, Chinese citizens started to take measures to protect themselves against COVID-19, such as staying at home as far as possible, limiting social contacts, and wearing protective masks when they needed to move in public.

Social distancing has been effective in past disease epidemics, curbing human-to-human transmission and reducing morbidity and mortality.^{11–17} A single social distancing policy can cut epidemic spread, but usually multiple such policies—including more restrictive measures such as isolation and quarantine—are implemented in combination to boost effectiveness. For example, during the 1918–19 influenza pandemic, the

New York City Department of Health enforced several social distancing policies at the same time, including staggered business hours, compulsory isolation, and quarantine, which likely led to New York City suffering the lowest death rate from influenza on the eastern seaboard of the USA.¹⁷

During the current outbreak of COVID-19, government officials and researchers were concerned that the mass movement of people at the end of the Lunar New Year holiday on Jan 31, 2020, would exacerbate the spread of COVID-19 across China. Moreover, individuals typically return from their Lunar New Year holiday after only 1 week, which is shorter than the longest suspected incubation period of the disease.¹⁸ Many of the 5 million people who left Wuhan before the travel ban was put into place³ could still have been latently infected when their holiday ended. This situation, together with the resumed travel activities, would make it difficult to contain the outbreak.

Facing these concerns, the Chinese Government extended the Lunar New Year holiday. The holiday end date was changed to March 10 for Hubei province¹⁹ and Feb 9 for many other provinces, so that the duration of the holiday would be sufficiently long to fully cover the suspected incubation period of COVID-19.^{20–22} In addition, people diagnosed with COVID-19 were isolated in hospitals. In Wuhan, where the largest number of

Published Online
February 20, 2020
[https://doi.org/10.1016/S0140-6736\(20\)30421-9](https://doi.org/10.1016/S0140-6736(20)30421-9)



infected people live, those with mild and asymptomatic infection were also quarantined in so-called shelter or “Fang Cang” hospitals, which are public spaces such as stadiums and conference centres that have been repurposed for medical care. Finally, the Chinese Government encouraged and supported grassroots activities for routine screening, contact tracing, and early detection and medical care of COVID-19 patients, and it promoted hand washing, surface disinfection, and the use of protective masks through social marketing and media. As a result of the extended holiday and the additional measures, many people with asymptomatic infection from Hubei province who had travelled to other provinces remained in their homes until they developed symptoms, at which point they received treatment. It is this home-based quarantine of people who had been to the epicentre of the epidemic and travelled to other locations in China that is likely to have been especially helpful in curbing the spread of the virus to the wider community.

There are several lessons that can be drawn from China’s extension of the Lunar New Year holiday. First, countries facing potential spread of COVID-19, or a similar outbreak in the future, should consider outbreak-control “holidays” or closure periods—ie, periods of recommended or mandatory closure of non-essential workplaces and public institutions—as a first-line social distancing measure to slow the rate of transmission. Second, governments should tailor the design of such outbreak-control closure periods to the specific epidemic characteristics of the novel disease, such as the incubation period and transmission routes. Third, a central goal of an outbreak-control closure period is to prevent people with asymptomatic infections from spreading the disease. As such, governments should use the closure period for information and education campaigns, community screening, active contact tracing, and isolation and quarantine to maximise impact. Such a combination approach is also supported by studies of responses to previous outbreaks, which showed that reductions in the cumulative attack rate were more pronounced when social distancing policies were combined with other epidemic control measures to block transmission.²³

As for COVID-19 in China, this combination of an outbreak-control closure period for social distancing and a range of accompanying epidemic control measures

seems to have prevented new infections, especially in provinces other than Hubei, where new infections have been declining for more than 2 weeks.¹ As fearsome and consequential as the COVID-19 outbreak has been, China’s vigorous, multifaceted response is likely to have prevented a far worse situation. Future empirical research will establish the full impact of the social distancing and epidemic control policies during the extended Chinese Lunar New Year holiday. As travel and work slowly resume in China, the country should consider at least partial continuation of these policies to ensure that the COVID-19 outbreak is sustainably controlled.

We declare no competing interests.

Simiao Chen, Juntao Yang, Weizhong Yang, *Chen Wang, Till Bärnighausen
wangchen@pumc.edu.cn

Heidelberg Institute of Global Health, Heidelberg Medical School, Heidelberg University, Heidelberg, Germany (SC, TB); State Key Laboratory of Medical Molecular Biology, Institute of Basic Medical Sciences, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, China (JY); Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, China (WY, CW); Chinese Academy of Engineering, Beijing, China (CW); and Harvard T H Chan School of Public Health, Harvard University, Boston MA, USA (TB)

- 1 National Health Commission of the People’s Republic of China. Updates on the epidemic. Feb 19, 2020. http://www.nhc.gov.cn/xcs/yqtb/list_gzbd.shtml (accessed Feb 19, 2020 [in Chinese]).
- 2 Ministry of Transport of the People’s Republic of China. Big data! The travel volume predictions during Lunar New Year holiday in 2020. Jan 9, 2020. http://www.mot.gov.cn/fenxigongbao/yunlifanxi/202001/t20200109_3322161.html (accessed Feb 15, 2020 [in Chinese]).
- 3 China News. The press conference on COVID-19 in Hubei. Jan 26, 2020. <https://m.chinanews.com/wap/detail/zb/2493.shtml> (accessed Feb 19, 2020 [in Chinese]).
- 4 Baidu Map. Location-based services of Baidu database. Feb 19, 2020. <https://qianxi.baidu.com> (accessed Feb 19 2020).
- 5 Guan W-J, Ni Z-Y, Hu Y, et al. Clinical characteristics of 2019 novel coronavirus infection in China. *medRxiv* 2020: published online Feb 9. <https://doi.org/10.1101/2020.02.06.20020974> (preprint).
- 6 The State Council of the People’s Republic of China. The State Council’s announcement on the arrangement of public holidays in 2020. Nov 21, 2019. http://www.gov.cn/zhengce/content/2019-11/21/content_5454164.htm (accessed Feb 3, 2020 [in Chinese]).
- 7 The State Council of the People’s Republic of China. The State Council’s announcement on extending the Lunar New Year Holiday in 2020. Jan 27, 2020. http://www.gov.cn/zhengce/content/2020-01/27/content_5472352.htm (accessed Jan 31, 2020 [in Chinese]).
- 8 National Health Commission of the People’s Republic of China. The press conference on Jan 26, 2020. <http://www.nhc.gov.cn/xcs/fkdt/202001/12ec9062d5d041f38e210e8b69b6d7ef.shtml> (accessed Jan 31, 2020 [in Chinese]).
- 9 The People’s Government of Beijing Municipality. The announcement of cancellations of major events including temple fairs in Beijing. Jan 23, 2020. <http://www.beijing.gov.cn/ywdt/gzdt/t1614497.htm> (accessed Feb 3, 2020 [in Chinese]).
- 10 The State Council of the People’s Republic of China. The announcement from Wuhan’s headquarter on the novel coronavirus prevention and control. Jan 23, 2020. http://www.gov.cn/xinwen/2020-01/23/content_5471751.htm (accessed Jan 31, 2020 [in Chinese]).
- 11 Poletti P, Caprile B, Ajelli M, Pugliese A, Merler S. Spontaneous behavioural changes in response to epidemics. *J Theor Biol* 2009; **260**: 31–40.
- 12 Hatchett RJ, Mecher CE, Lipsitch M. Public health interventions and epidemic intensity during the 1918 influenza pandemic. *Proc Natl Acad Sci USA* 2007; **104**: 7582–87.

- 13 Ahmed F, Zviedrite N, Uzicanin A. Effectiveness of workplace social distancing measures in reducing influenza transmission: a systematic review. *BMC Pub Health* 2018; **18**: 518.
- 14 Ferguson NM, Cummings DA, Cauchemez S, et al. Strategies for containing an emerging influenza pandemic in Southeast Asia. *Nature* 2005; **437**: 209–14.
- 15 Glass RJ, Glass LM, Beyeler WE, Min HJ. Targeted social distancing designs for pandemic influenza. *Emerg Infect Dis* 2006; **12**: 1671.
- 16 Caley P, Philp DJ, McCracken K. Quantifying social distancing arising from pandemic influenza. *J Roy Soc Interface* 2008; **5**: 63–69.
- 17 Markel H, Lipman HB, Navarro JA, et al. Nonpharmaceutical interventions implemented by US cities during the 1918–1919 influenza pandemic. *JAMA* 2007; **298**: 644–54.
- 18 Li Q, Guan X, Wu P, et al. Early transmission dynamics in Wuhan, China, of novel coronavirus-infected pneumonia. *N Engl J Med* 2020; published online Jan 29. DOI:10.1056/NEJMoa2001316.
- 19 The People's Government of Hubei Province. The announcement from the Hubei Provincial Novel Coronavirus Pneumonia Prevention and Control Headquarter. Feb 20, 2020. <http://www.hubei.gov.cn/zhuanti/2020/gzxxgzbd/zxtb/202002/> (accessed Feb 20, 2020 [in Chinese]).
- 20 The People's Government of Beijing Municipality. Companies can flexibly arrange jobs during the novel coronavirus epidemic except for those absolutely necessary for the normal operation of cities. Feb 1, 2020. http://www.gov.cn/xinwen/2020-02/01/content_5473522.htm (accessed Feb 3, 2020 [in Chinese]).
- 21 The People's Government of Shanghai Municipality. The announcement on postponing the reoperation date of companies and the reopening date of schools. Jan 27, 2020. <http://www.shanghai.gov.cn/nw2/nw2314/nw2315/nw43978/u21aw1423601.html> (accessed Feb 15, 2020 [in Chinese]).
- 22 The People's Government of Hangzhou Municipality. The announcement on postponing the reoperation date of companies and the reopening date of schools. Jan 27, 2020. http://www.hangzhou.gov.cn/art/2020/2/9/art_1256295_41893739.html (accessed Feb 15, 2020 [in Chinese]).
- 23 Fong M, Gao H, Wong J, et al. Nonpharmaceutical measures for pandemic influenza in nonhealthcare settings—social distancing measures. *Emerg Infect Dis* 2020; published online Feb 6. DOI:10.3201/eid2605.190995.