

Asymptomatic carriers of COVID-19 as a concern for disease prevention and control: more testing, more follow-up

Jiao Zhang¹, Shoucai Wu², Lingzhong Xu^{1,3,*}

¹ School of Public Health, Cheeloo College of Medicine, Shandong University, Ji'nan, Shandong, China;

² Department of Geriatrics, Qilu Hospital, Cheeloo College of Medicine, Shandong University, Ji'nan, Shandong, China;

³ NHC Key Laboratory of Health Economics and Policy Research, Cheeloo College of Medicine, Shandong University, Ji'nan, Shandong, China.

SUMMARY Following a containment phase of two months, China has transitioned to the mitigation phase. However, China still faces the risk of COVID-19 spreading due to not only to sporadic new cases and imported cases but also asymptomatic carriers. According to daily reports from the National Health Commission of the People's Republic of China from March 31, 2020 to April 7, 2020, the number of new asymptomatic cases reported daily greatly exceeded that of new imported cases. As of 24:00 on April 7, there were a total of 1,095 asymptomatic cases with COVID-19 under medical observation on the Chinese mainland, including 358 imported cases. A growing number of studies have indicated that asymptomatic carriers are infectious to an extent and can potentially transmit COVID-19. At present, China's measures for managing asymptomatic carriers are 14 days of centralized quarantine and observation; in principle, people with two consecutive negative nucleic acid tests (at an interval of at least 24 hours) can be released from quarantine. However, asymptomatic carriers will not be included in confirmed cases unless they develop clinical manifestations while in quarantine. As "silent spreaders", asymptomatic carriers warrant attention as part of disease prevention and control. The testing and follow-up of asymptomatic carriers should be expanded to include people in close contact with patients with confirmed COVID-19 and asymptomatic cases, clusters of outbreaks, and key areas and populations with a high risk of infection.

Keywords coronavirus disease 2019 (COVID-19), asymptomatic infections, China

According to a World Health Organization report, China has transitioned to the mitigation stage following a two-month containment phase (1). Currently, the sporadic cases of COVID-19 have appeared in China for several days, but the epidemic is still rapidly worsening in Europe and the United States. The number of confirmed imported cases of COVID-19 has exceeded that of autochthonous cases, placing pressure on patient treatment, disease control and investigation, nucleic acid detection, and quarantine facilities of cities of entry. According to daily reports from the National Health Commission of the People's Republic of China, this situation has arisen as the number of new imported cases has exceeded that of new domestic cases since March 13, 2020 (Figure 1). Although the number of imported cases is still low, there may be imported cases for a considerable period of time. China still faces the dual risk of a COVID-19 spread due to sporadic new cases and imported cases. At present, most regions in China are focusing on the prevention and control of imported cases from overseas, and all overseas arrivals must be

quarantined in designated places for 14 days. However, asymptomatic carriers are "silent spreaders" and also warrant attention in terms of disease prevention to contain the epidemic.

On February 5, 2020, the "Diagnosis and Treatment Protocol for COVID-19 (Fifth ed., Trial)" was released by the National Health Commission of the People's Republic of China, and asymptomatic infection was first included as a source of infection (2). Recently, asymptomatic carriers have been detected in Liaoning, Zhejiang, Shandong, and other provinces of China, and suspected asymptomatic carriers have even appeared in some areas. The existence of asymptomatic infections is one feature that distinguishes the COVID-19 epidemic from the SARS epidemic in 2003. Moreover, a study by Chu *et al.* (3) found that SARSCoV-2 replicated more efficiently but induced significantly less of a host interferon and proinflammatory response than SARS-CoV, which suggests that SARS-CoV-2 is transmitted person-to-person in a highly efficient manner and that it frequently causes asymptomatic infections. Some of the first detailed

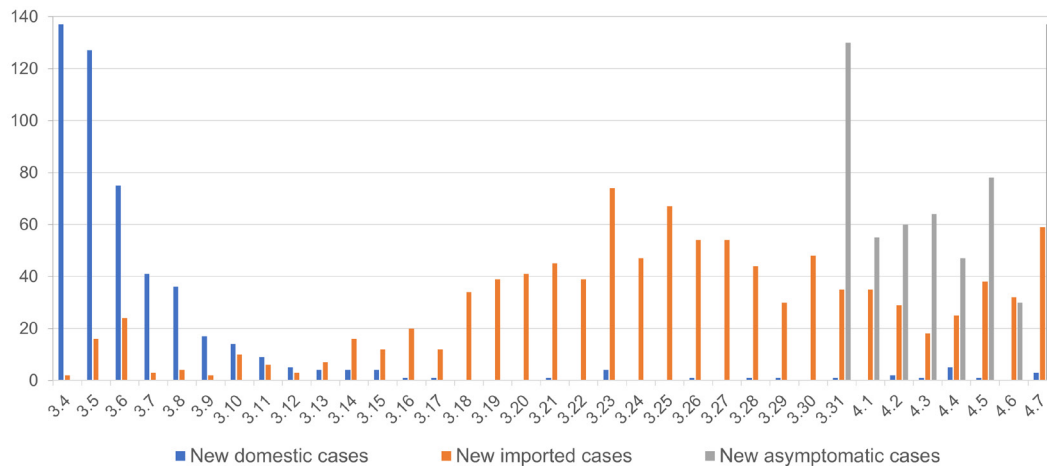


Figure 1. New COVID-19 cases in China from March 4, 2020 to April 7, 2020. Data source: National Health Commission of the People's Republic of China, http://www.nhc.gov.cn/xcs/yqtb/list_gzbd.shtml

estimates suggested that covert cases of COVID-19 could represent some 60% of all infections (4).

Furthermore, asymptomatic carriers may be highly infective during the incubation period. A recent study found that the viral load detected in asymptomatic carriers was similar to that in symptomatic patients, which suggests the transmissible potential of asymptomatic or minimally symptomatic patients (5). Scientists with the Ningbo Center for Disease Control and Prevention in East China's Zhejiang Province recently found that 6.3% of the close contacts of patients with confirmed COVID-19 were ultimately infected with the virus; 4.4% of the close contacts of asymptomatic carriers were ultimately infected (6). Another recent study involving 24 cases found that asymptomatic carriers have a certain level of infectivity and that the period of viral infection can be up to 29 days (7). The researchers in that study pointed out the importance of identifying and isolating asymptomatic carriers and patients with mild symptoms in order to contain the epidemic (7).

The National Health Commission of the People's Republic of China has included asymptomatic cases in its daily report since April 1 (8). From March 31 to April 7, the number of new asymptomatic cases reported daily greatly exceeded that of new imported cases (Figure 1). As of 24:00 on April 7, 2020, there were 1,095 asymptomatic carriers under medical observation on the Chinese mainland, including 358 imported cases (9). At present, China's measures for managing asymptomatic carriers are 14 days of centralized quarantine and observation; in principle, people with two consecutive negative nucleic acid tests (at an interval of at least 24 hours) can be released from quarantine. However, asymptomatic carriers will not be included in confirmed cases unless they develop clinical manifestations while in quarantine (10).

As "silent spreaders", asymptomatic carriers warrant attention as part of disease prevention and control; more

efforts should be made to monitor, track, quarantine, and treat asymptomatic carriers. The testing and follow-up of asymptomatic carriers should be expanded to include people in close contact with patients with confirmed COVID-19 and asymptomatic cases, clusters of outbreaks, and key areas and populations with a high risk of infection. Once asymptomatic carriers are identified, an epidemiological investigation should be promptly conducted, the sources of infection for those cases should be determined as early as possible, and relevant information should be published publicly and openly.

References

1. WHO. Coronavirus disease 2019 (COVID-19) Situation Report – 76 2020. https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200405-sitrep-76-covid-19.pdf?sfvrsn=6ecf0977_2 (accessed April 6, 2020).
2. National Health Commission of the People's Republic of China . Notice on the issuance and dissemination of the Diagnosis and Treatment Protocol for COVID-19 (Fifth ed., draft) 2020. <http://www.nhc.gov.cn/yzygj/s7653p/202002/3b09b894ac9b4204a79db5b8912d4440.shtml> (accessed April 8, 2020). (in Chinese)
3. Chu H, Chan JF-W, Wang Y, *et al.* Comparative replication and immune activation profiles of SARS-CoV-2 and SARS-CoV in human lungs: An ex vivo study with implications for the pathogenesis of COVID-19. *Clin Infect Dis.* 2020; doi: 10.1093/cid/ciaa410.
4. Qiu J. Covert coronavirus infections could be seeding new outbreaks. *Nature* 2020; doi: 10.1038/d41586-020-00822-x.
5. Zou L, Ruan F, Huang M, *et al.* SARS-CoV-2 viral load in upper respiratory specimens of infected patients. *N Engl J Med.* 2020; 382:1177-1179.
6. Chen Y, Wang A, Yi b, Ding KQ, Wang HB, Wang JM, Shi HB, Wang SJ, Xu GZ. The epidemiological characteristics of infection in close contacts of COVID-19 in Ningbo City. *Chinese Journal of Epidemiology.* 2020; 41:668-672. (in Chinese)
7. Hu Z, Song C, Xu C, Jin G, Chen Y, Xu X, Ma H, Chen W,

- Lin Y, Zheng Y, Wang J, Hu Z, Yi Y, Shen H. Clinical characteristics of 24 asymptomatic infections with COVID-19 screened among close contacts in Nanjing, China. *Sci China Life Sci.* 2020; doi: 10.1007/s11427-020-1661-4.
8. State Council of China. April 1, 2020. Press Conference of the State Council's Organization for COVID-19 Prevention and Control. <http://www.gov.cn/xinwen/gwyl/flkjz77/index.htm> (accessed April 4, 2020). (in Chinese)
 9. National Health Commission of the People's Republic of China. The latest updates on COVID-19 outbreaks as of 24:00 on April 7. <http://www.nhc.gov.cn/xcs/yqtb/202004/5e2b6f0bd47d48559582242e3878447d.shtml> (accessed April 18, 2020). (in Chinese)
 10. People's Government of the People's Republic of China. The State Council's Organization for COVID-19 Prevention and Control: Notice on issuance and dissemination of Practices for Management of Asymptomatic Carriers with COVID-19. http://www.gov.cn/zhengce/content/2020-04/08/content_5500371.htm (accessed April 8, 2020). (in Chinese)
- Received April 9, 2020; Revised April 14, 2020; Accepted April 20, 2020.
- *Address correspondence to:*
Lingzhong Xu, Department of Social Medicine and Maternal & Child Health, School of Public Health, Shandong University, No. 44 Wenhua Xi Road, Ji'nan 250012, China.
E-mail: lzxu@sdu.edu.cn
- Released online in J-STAGE as advance publication April 22, 2020.