

# Why did so few healthcare workers in China get COVID-19 infection

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Corona virus diseases 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a global pandemic.<sup>1</sup> Healthcare workers (HCWs) are facing high risks of being infected by SARS-CoV-2 in the fighting with COVID-19.<sup>2</sup> In the early days (January and February) of the pandemic, 3,387 HCWs in 476 healthcare institutions in China were infected by the virus with 90.4% in Hubei province, the epicenter, according a joint commission of WHO and China (e.g. <https://new.qq.com/rain/a/20200224A0QTPR00>), while there were 12.9 millions HCWs in China.<sup>3</sup> Afterwards, infection of HCWs was only occasionally reported in China. In particular, none of the 42.6 thousand HCWs across China dispatched to Hubei acquired COVID-19. In West China Hospital with 5,000 beds and an average 15,000 outpatient visits per day, we performed universal SARS-CoV-2 nucleic acid and antibody testing for our 10,000 HCWs and none was infected by SARS-CoV-2 (data not shown). We therefore propose potential reasons based on our front-line experience to discuss why only few HCWs in China had COVID-19. As the pandemic is ongoing, we believe that this experience-based comment may be helpful to reduce risks of acquiring COVID-19 among HCWs.

First, universal mask wearing of HCWs in healthcare settings was implemented at the early stage of the pandemic in China. In the middle of January, the National Health Commission of China, an equivalent of Ministry of Health,

issued a national guidance for COVID-19 prevention and control, in which HCWs were required to wear masks in clinical duties. This guidance was issued before the large-scale wave of COVID-19 cases exporting from Wuhan, the capital city of Hubei province, to other parts of China. Our hospital implemented the policy of universal mask wearing for HCWs on January 17, three days prior to the identification of our first COVID-19 case. We were aware that there were only limited, low-quality evidence to support universal mask wearing at that time, but we took this pragmatic approach as COVID-19 is a respiratory infection and wearing masks could provide protection with only little harms. Although the vast majority of HCWs at that time did not see any COVID-19 cases, they were aware that SARS-CoV-2 was genetically similar to severe acute respiratory syndrome coronavirus (SARS), which had caused high-profile outbreaks in China in 2002 and 2003 with high mortalities. The universal mask wearing was well accepted and completely implemented in healthcare settings and we did not face any argues. The major problem was to provide enough masks.

Second, quick responses were made to secure the supply of personal protective equipment (PPE) including masks. The consumption of PPE is high when tackling COVID-19 and how to secure supply in this pandemic is a pivotal issue. Our hospital responded quickly to place large orders of PPE. However, manufacturers were overbooked due to the sudden burst of needs, most workers had left for Chinese New Year, and the deliverer is delayed as the

whole country strengthened movement control. Many hospitals then requested donation of PPE from the public and their alumni. It would take a few days for PPE to arrive. There was indeed a shortage of PPE in our hospital at end of January. The infection control team worked together with supply teams to triage PPE according to clinical and protective needs with the priority for high-risk units including the fever clinic, isolation wards and ICUs.<sup>4</sup> HCWs here were fully aware of the serious COVID-19 situation and were informed the PPE shortage and therefore understood and well cooperated to cope with the shortage. HCWs maximized PPE use by adjusting shifts to reduce PPE replacement at that time. The shortage was overcome with the arrival of new PPE.

Third, we have adopted a higher standard of protection in China, compared with the World Health Organization guidelines against COVID-19.<sup>5</sup> The main difference is that we used fluid-resistant protective clothing (coverall) with long sleeve and conjoined cap rather than uncapped isolation garment, as well as use respirators (i.e. N95 or European Union standard FFP2) rather than medical surgical masks, in wards dedicated for COVID-19 patients. A respirator, double rubber gloves, eye protection (i.e. goggles or a face shield), coverall and shoe covers were the standard equipment in contacting with COVID-19 patients in China.

Fourth, COVID-19 patients were centralized for management in designated

hospitals in China, which was a national policy. Each county and each city have at least one designated hospital for COVID-19. Such a centralized approach could make use of limited medical resource efficiently and also significantly reduced risks of acquiring COVID-19 for HCWs in non-designated hospitals, which constituted the majority of healthcare institutions. In our hospital, COVID-19 cases were managed in dedicated isolation wards, which also minimize the exposure risks of HCWs in other wards.<sup>6</sup>

Last, the stringent lockdown and community control measures curbed the transmission in community<sup>7</sup> and therefore significantly minimize risks of being infected outside hospitals. The whole society of China was determined to contain COVID-19 and has put enormous, well-organized efforts with participation of almost everyone. The massive education by all kinds of media well altered the Chinese population and the previous experience of SARS also reminded everyone to comply the control measures to avoid severe consequences. The universal participation with social cohesion and the great scarification owing to our Chinese culture, which may be difficult to be understood elsewhere, is a major force to drive the rapid control of COVID-19 in community. This in turn remarkably reduced the risks of HCWs to acquire COVID-19 in our daily life at home, in residential area, in commuting, and so on.

In summary, coordinated efforts of the whole society, governments, healthcare institutions, infection control teams and HCWs on their own are able to largely minimize the exposure risks of HCWs. We believe that the well-accepted universal mask wearing and the unprecedentedly stringent lockdown are major drivers to reduce the number of HCWs to acquire COVID-19 in China.

### **Competing interests**

The authors declare that they have no competing interests.

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