

# Critical care capacity during the omicron wave of the COVID-19 pandemic in China: far from enough

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The omicron wave of the COVID-19 pandemic has put enormous pressure on China and has caused dynamic zero-case policy changes.<sup>1</sup> As of November 30, 2022, there were 37,347 confirmed cases in 31 provinces across the country (including 99 severe cases and a severe rate of 265/100,000).<sup>2</sup> With the expansion of the scope of infection and the reduction of the rate of severe patients, the central government requires to improve the treatment capacity of hospitals to avoid the run out of medical resources.<sup>3</sup>

Increasing cases in China will create substantial demand for hospital admission and critical care. A cross-sectional observational study was to assess the number of adult critical care beds in Asian countries and regions in 2017, and there were 3.6 intensive care unit (ICU) beds per 100,000 population (67,153), ranging from 0.7 in Bangladesh to 28.5 in Taiwan. In China, there were only 3.6 critical care beds per 100,000 population.<sup>4</sup> In 2021, there were 4.8 critical care beds per 100,000 population, ranging from 2.0 in Jilin to 7.9 in Henan<sup>5</sup> (Fig. 1). Taking Singapore as the standard (11.4 critical care beds per 100,000 population),<sup>4</sup> China will need to increase the number of beds by 93,790 in the future to cope with the medical impact that may be brought about by the liberalization of the zero-clearing policy. The three provinces with the largest gaps are Guangdong (9057), Jiangsu (6212), and Shandong (5573) (Fig. 2). If estimated according to China's severe disease rate (265/100,000), China has a 1% infection rate (14 million), requiring 37,100 ICU beds, accounting for more than half (55.0%) of all ICU beds in China. According to the assumption that 20% of the beds are used to treat COVID-19, China still needs more than 100,000 new beds.

Clearly, the ability to maintain sustainable critical care services is a crucial consideration for all healthcare systems.<sup>6</sup> Results in a systematic review did suggest low ICU mortality rates for COVID-19 patients.<sup>7</sup> Public

health officials and hospital administrators should consider interventions that reduce COVID-19 ICU demand to improve survival among patients with COVID-19 in the ICU.<sup>8</sup> At the peak of Omicron COVID-19 outbreaks, the need for ICU beds will substantially exceed the current number of bed reserves, and the number of beds required varies significantly across provinces. For the backward areas in the west and north (such as Jilin, Ningxia, and Tibet), the central government needs to increase economic and medical investment to effectively deal with the impact of the sharp increase in the number of infections on the medical system and reduce the death of severe patients with COVID-19 and reduced impact on routine patient care. We call for confrontation with the future challenges for the healthcare system, especially the critical care capacity in China. In order to avoid the occurrence of run out of medical resources, the pre-examination and triage system should also be improved. During the Omicron-predominant period, overall weekly adult hospitalization rates peaked at 38.4 per 100,000.<sup>9</sup> The medical resources should be reserved for critical patients. Lastly, the vaccine's protective effect on the population, especially the elderly and children, is very significant.<sup>10</sup> However, the vaccination rate of the elderly in China is not high (less than 80%). While preparing medical resources, the government needs to further promote vaccination among vulnerable populations.

The analysis of this study is mainly based on the data from Singapore. The different type of vaccines and vaccination rate should be considered. The rate of vaccination is different between China and Singapore which is much higher in Singapore than in China. By March 10, 2022, the prevalence of full vaccination (ie, completed 2 doses of vaccination) was 91% of the total population in Singapore.<sup>11</sup> As of July 23, 2022, the full vaccination rate of the Chinese population was 89.7%, and the vaccination rate of the elderly over 60 years old



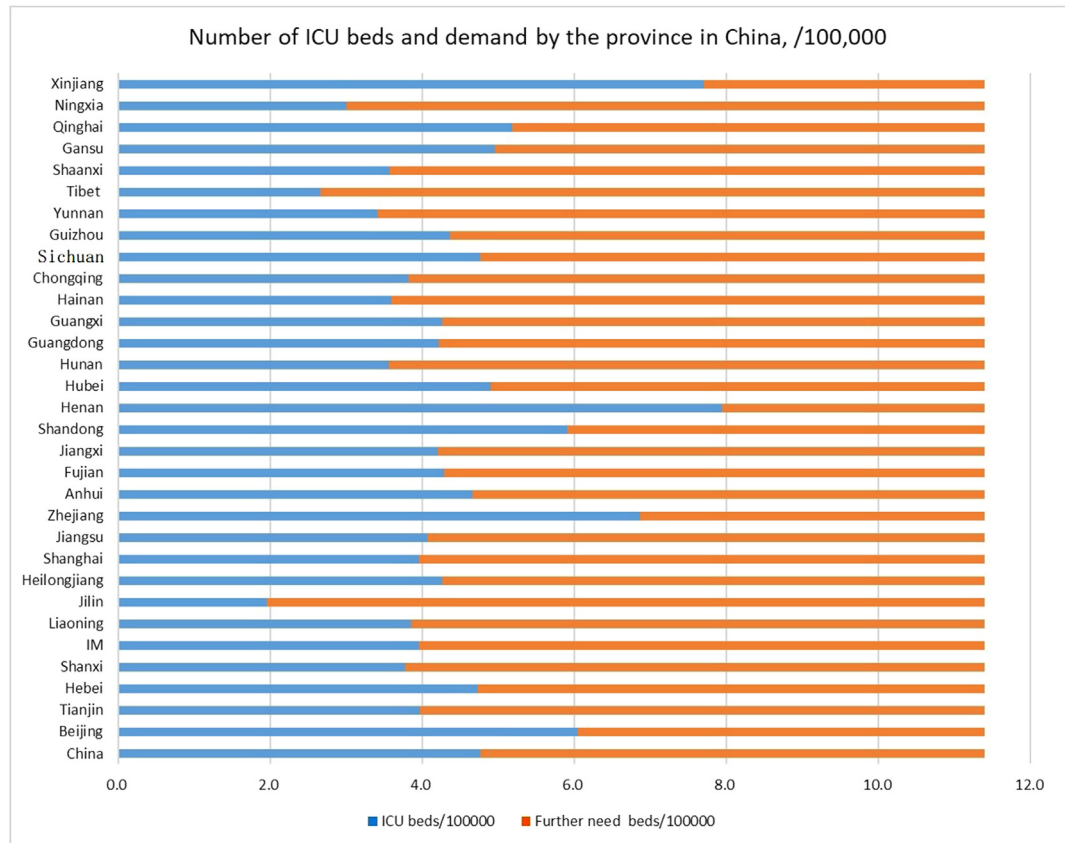
The Lancet Regional Health - Western Pacific 2023;31: 100689

Published Online xxx  
<https://doi.org/10.1016/j.lanwpc.2023.100689>

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**Fig. 1:** The number of ICU beds and further demand by the province in China per 100,000 population. Take Singapore ICU configuration as standard.

was only 84.7%.<sup>12</sup> It had been found that unvaccinated persons had 13.9 and 53.2 times the risks for infection and COVID-19-associated death, respectively, compared with fully vaccinated persons who received booster doses, and 4.0 and 12.7 times the risks compared with fully vaccinated persons without booster doses.<sup>10</sup> As a result, the rate of critically infected patients might be different between the two countries.

#### Contributors

Dr Du had full access to all the data in the study and took responsibility for the integrity of the data and the data analysis accuracy. Study concept and design: All authors; Acquisition of data: Tu; Analysis and interpretation of data: All authors; Drafting of the manuscript: Tu; Critical revision of the manuscript for important intellectual content: Liu, Zeng; Statistical analysis: Liu; Administrative, technical, or material support: all authors; Obtained funding: Tu; Study supervision: Tu.

#### Data sharing statement

All data generated or analyzed during this study are included in this article. Further inquiries can be directed to the corresponding author.

#### Funding sources

This study was supported by China Postdoctoral Science Foundation (No. 2019M660921 and 2020T130436); The funding organizations had no role in the study's design and concept; the collection, management,

analysis, and interpretation of the data; or the manuscript's preparation, review, or approval.

#### Declaration of interests

The authors have no conflicts of interest to declare.

#### Acknowledgment

They are grateful to all the health workers in China: their expertise & humanity are fundamental to stopping severe acute respiratory syndrome coronavirus from spreading further.

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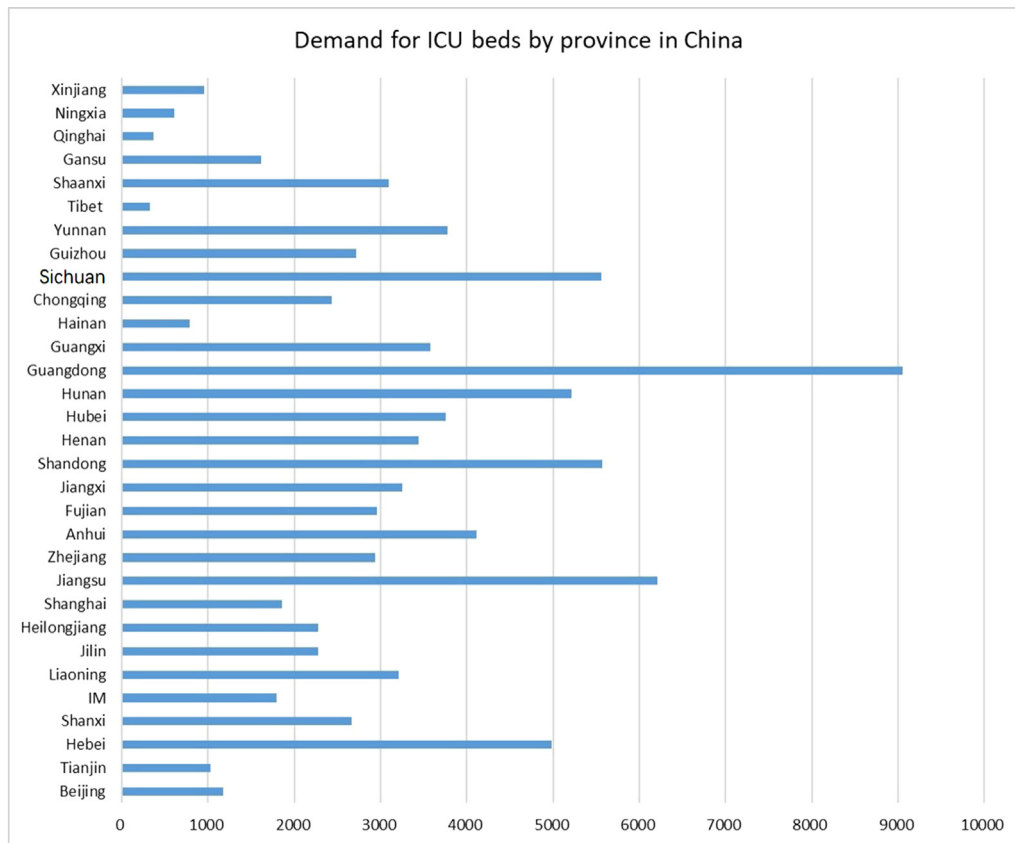


Fig. 2: Further demand for ICU beds by the province in China. Take Singapore ICU configuration as standard.

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