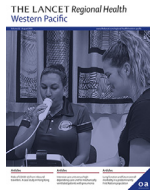




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## Commentary

# The right care at the right place: Significance of intensive care units for critically ill patients

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## 1. Commentary

Providing the right critical care within the right time frame at the right place is essential for improving outcomes of acute critically ill patients. Intensive care units (ICUs) are the “right place,” designed to deliver critical care for mechanically ventilated patients [1]. Despite this, there are still shortages of ICU beds and of hospitals with ICUs, even in advanced economies such as Japan and the United Kingdom [2].

A high-dependency care unit (HDU), called a “high care unit” in Japan or “intermediate care unit” in some other countries, is a potential ICU alternative. It does provide less-intensive care, with a ratio of fewer nurses to patients (1:4 or 1:5 vs. 1:2 in an ICU) and/or lack of on-staff intensivists. Whether these lower intensity units could provide sufficient “right care” compared with ICUs remains uncertain. Recently in *The Lancet Regional Health – Western Pacific*, Hiroyuki Ohbe and colleagues [3] sought to answer the clinically important question of whether pneumonia patients needing mechanical ventilation should receive care in ICUs or HDUs. The researchers clearly showed substantive evidence that patients cared for in an ICU had a 7.2% decrease in 30-day in-hospital mortality compared with those in an HDU [3]. The researchers should be commended for presenting robust data using sophisticated statistical methodology to remove confounders in the adjusted analyses, and with multiple sensitivity analyses. Their data effectively represent a nationwide trend, as they likely encompass >90% of

all acute care hospitals in Japan. Importantly, the data show the care structure; i.e., provision of ICU care significantly impacted outcomes of those with severe disease, without using a magic bullet.

Acute care provision in Japan has a characteristic structure. Among advanced economies, Japan has the most acute care beds per person, though ICU beds are relatively scarce [2,4]. Comparable numbers of HDU beds are, however, available. Hiroyuki Ohbe and colleagues’ data imply that transferring all HDU beds to ICUs could save >100 critically ill pneumonia patients annually in the studied cohort. Clarification is needed, however, on how and where ICUs could be disseminated. Should acute care hospitals be mandated to have both HDUs and ICUs? Should all HDUs without ICUs in hospitals be upgraded to ICUs? Should hospitals with HDUs, but not ICUs, be unified with hospitals with only ICUs? Should critically ill patients be centralized in hospitals with both ICUs and HDUs? Additional analysis, considering cost–benefit effects, is needed for answering these questions. This could add critical insight for policymakers in planning and providing critical care systems.

Whether nurse staffing (one nurse per two patients), physician staffing, both, or unexplained factors may affect improved mortality is worth discussing. A systematic review and meta-analysis suggested high-intensity intensivist staffing is associated with reduced ICU- and hospital mortality [5]. The greatest differences in mortality seen between ICUs with ICU management fees 1 or 2 vs. HDUs (−8.7% for median) suggests multiple staffing of designated intensivists with sufficient education and certification—mandatory when receiving ICU management fees 1 or 2—may play a significant role in improving immediate care, and ultimately in saving lives. This finding might be supported by another study by the

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same researchers [6], indicating the presence of intensivists evidently shows stronger association with reduced mortality for mechanically ventilated critically ill patients (adjusted odds ratio [OR] of mortality of 0.88 [0.78–0.98]) compared with that of certified nurses (OR=0.97 [0.94–1.00]).

Finally, it should be noted that those data were obtained before the COVID-19 pandemic, at a relatively stable time. The pandemic that burgeoned in 2020 resulted in rapid and extraordinary surges in critically ill COVID-19 patients requiring mechanical ventilation. This substantially challenged ICU management [7], with the surge potentially overwhelming the capacity of ICUs, nurses, and intensivist staff, and ultimately causing greater mortality in several countries/regions [8,9]. In Japan, the numbers of critically ill COVID-19 patients managed in an ICU and on a ventilator was, fortunately, relatively low during the pandemic's first to third waves between February 2020 and March 2021, with relatively low mortality [10]. The cases, however, have dramatically increased in some Japanese metropolitan areas in the ongoing fourth wave from May 2021. Case demands were expected to exceed ICU capacity. Ohbe and colleagues are therefore strongly requested to conduct further analysis by including data acquired during the pandemic phase. Doing so should offer additional insights regarding ICU preparedness at the contingency phase.

#### Declaration of Competing Interest

I declare no competing interests.

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#### References

- [1] Nates JL, Nunnally M, Kleinpell R, Blosser S, Goldner J, Birriel B, et al. ICU admission, discharge, and triage guidelines: A framework to enhance clinical operations, development of institutional policies, and further research. *Critical Care Medicine* 2016;44:1553–602.
- [2] Shime N. Clinical and investigative critical care medicine in Japan. *Intensive Care Med* 2016;42:453–5.
- [3] Ohbe H, Sasabuchi Y, Yamana H, Matsui H, Yasunaga H. Intensive care unit versus high-dependency care unit for mechanically ventilated patients with pneumonia : a nationwide comparative effectiveness study. *The Lancet Regional Health - Western Pacific*; 2021. doi:10.1016/j.lanwpc.2021.100185.
- [4] Phua J, Faruq MO, Kulkarni AP, Redjeki IS, Detleuxay K, Mendsaikhan N, et al. Critical Care Bed Capacity in Asian Countries and Regions. *Crit Care Med* 2020;654–62.
- [5] Wilcox ME, Chong CAKY, Niven DJ, Rubinfeld GD, Rowan KM, Wunsch H, et al. Do intensivist staffing patterns influence hospital mortality following icu admission? A systematic review and meta-analyses. *Crit Care Med* 2013;41:2253–74.
- [6] Morita K, Matsui H, Yamana H, Fushimi K, Imamura T, Yasunaga H. Association between advanced practice nursing and 30-day mortality in mechanically ventilated critically ill patients: A retrospective cohort study. *J Crit Care* 2017;41:209–15.
- [7] Phua J, Weng L, Ling L, Egi M, Lim C-M, Divatia JV, et al. Intensive care management of coronavirus disease 2019 (COVID-19): challenges and recommendations. *Lancet Respir Med* 2020;8:506–17.
- [8] Grasselli G, Zangrillo A, Zanella A, Antonelli M, Cabrini L, Castelli A, et al. Baseline Characteristics and Outcomes of 1591 Patients Infected with SARS-CoV-2 Admitted to ICUs of the Lombardy Region. Italy. *JAMA*. 2020;323(16):1574–81.
- [9] Richardson S, Hirsch JS, Narasimhan M, Crawford JM, McGinn T, Davidson KW, et al. Presenting Characteristics, Comorbidities, and Outcomes Among 5700 Patients Hospitalized With COVID-19 in the New York City Area. *JAMA* 2020;10022:1–8.
- [10] Japan ECMOnet for COVID-19, Shime N. Save the ICU and save lives during the COVID-19 pandemic. *J Intensive Care* 2020;8:8–10.