

## COMMENTARY

# The risks and rewards of expanding ICU capacity

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## Abstract

ICU capacity strain is associated with increased morbidity and lost hospital revenue, leading many hospitals to increase the number of ICU beds. However, this approach can lead to inefficiency and waste. A recent report in *Critical Care* highlights a different approach: creating new service lines for low-risk patients. In this case, the authors staffed a post-anesthesia care unit with an intensivist-led care team, resulting in lower hospital costs with no changes in ICU mortality. Although this type of change carries some risks, and will not work for every hospital, it is an example of the creative solutions hospitals must sometimes undertake to maintain the supply of critical care in response to a rising demand.

A recent report in *Critical Care* demonstrates the types of steps hospitals are taking to address the growing problem of ICU capacity constraints [1]. These steps are often necessary, as ICU strain leads to serious, real-world problems. For example, both admission delays from the emergency department to the ICU and premature discharges from the ICU to the ward are associated with increased mortality [2,3]. Moreover, although the data are mixed, new evidence suggests that when ICUs are strained, patients in the ICU experience a greater risk of death [4]. Full ICUs can also affect a hospital's bottom line. Cancelling high-risk elective surgeries due to a lack of appropriate postoperative care means less revenue at a time when many hospitals are struggling financially [5].

Clearly the stakes are high. When faced with ICU capacity constraints, however, hospitals have a limited number of options. The first, and perhaps most obvious, option is to simply add more ICU beds. Hospitals are taking this approach in the United States, where the

number of ICU beds is increasing over time [6]. However this approach is misguided at best and harmful at worst – hospitals vary in the degree to which they use intensive care without much variation in outcome, suggesting that many ICU patients do not really benefit from ICU-level care [7]. Additionally, increasing the number of ICU beds increases the hospitals fixed costs while at the same time creating waste in the system during times when the ICU is not full [8].

Another option is to create alternative levels of care within the hospital for moderate-risk patients who may not need the ICU. These alternatives can take the form of step-down units for patients in recovery [9] or, as demonstrated by Kastrup and colleagues, expanded post-anesthesia care units (PACUs) that can care for intermediate risk, short-stay patients [1]. The benefits of these approaches are that they increase ICU capacity more efficiently than simply adding ICU beds, since these types of beds are cheaper to maintain. As a case in point, in Kastrup and colleagues' study the hospital case mix index – a measure of hospital efficiency related to the average cost per case – increased from 0.286 to 0.309, indicating a lower cost per case and, presumably, higher operating margins. At the same time, length of stay in the ICU increased – probably due to both removal of short-stay postoperative patients from the denominator and a lack of bed pressure to discharge patients earlier in their treatment course.

Although at first glance this move appears to have been a good one for the hospital, it is worth noting several caveats that could cause efforts like these to backfire. First, increasing ICU capacity by shuttling some post-operative patients through the PACU could just result in more low-risk patients being admitted from the ward [10]. This effect would increase the cost of care for these patients, negating other cost savings. Second, this move presupposes that an intensivist and trained ICU nurses are available to staff the PACU. In many health systems, a shortage of trained ICU staff might make this type of staffing change impossible [11].

In addition to these caveats, Kastrup and colleagues' study has some noteworthy limitations. The case mix index is a crude measure of hospital efficiency, and actual costs, charges and margins are not reported. Also, this

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was a single-center, before–after study that did not control for severity of illness. At least some of these changes are probably due to differences in severity of illness on admission and routine temporal trends, rather than due to the staffing change itself.

Despite these limitations, Kastrup and colleagues' study provides important lessons about the risks and rewards of expanding ICU capacity. Providing high-quality critical care in the era of capacity constraints requires creative solutions. Adding more ICU beds is conceptually easy but is also costly and inefficient. Developing new service lines that can care for intermediate-risk patients is more efficient, but is only of value in some circumstances. For example, the high-intensity PACU approach of Kastrup and colleagues will not work for ICUs with low numbers of postoperative patients or for ICUs that only care for extremely high-risk surgery patients that almost always require ICU admission. Finally, we must remember that much of ICU utilization is overuse – many patients, especially those at very high risk of death, would not want intensive care at their end of life [12]. Addressing capacity constraints purely by adding capacity, rather than working to prevent overuse, may be a missed opportunity to better align care with patient preferences. Otherwise we risk making changes that are purely about improving the bottom line, rather than about improving care for our patients.

#### Abbreviations

PACU, post-anesthesia care unit.

#### Competing interests

The author declares that he has no competing interests.

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